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ON MONOMANIA.

BY

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THE term monomania, though naturalized into common speech, has had a somewhat dubious standing as the designation of a medical species of insanity. Some of those who have employed it have done so with a qualification, others employ it even in recent memoirs in widely-different significations, and one has only to examine the various reports of our asylums to see how large, and then again how small a part it plays in their classifications.

It is not my intention here to review the authorities who have written for or against the admission of the term into the nomenclature of insanity, but simply to offer a few suggestions that have occurred to me in attempting to classify the inmates of a public asylum. First, as to the existence of a true monomania in the sense of a mental derangement limited to a single fixed delusion. This appears to have been a stumbling-block to many in the use of the term, for literally, and in its popular usage, monomania means just this thing. Those even who admit, after a fashion, the existence of a partial insanity do not always carry the idea to its logical extent. Krafft-Ebing says,[1] for example, that, "were a person actually sane, with the exception of a single delusion, the recognition and correction of the latter would immediately ensue. The existence of the delusion, in spite

[1] Lehrbuch der Psychiatrie, i., p. 76.

of the otherwise apparent general sanity, shows that this is only apparent—that the individual is really more unsound than he seems to be." The reasoning in the above is not very strong, but I quote the passage, since it is satisfactory in the judgment of a master in psychological medicine. It is not essential here to enter into a general discussion or definition of insane delusions, it is sufficient to say what will be, I think, generally admitted, that they are not necessarily absurd in themselves, so as to carry their own refutation in a logical mind. An insane delusion may be of such a sort that it might, under certain, very possible conditions, have been not a delusion at all, and if an individual exhibits only a single false fixed idea of this kind, it seems a good deal of assumption to assume *a priori*, in spite of observation, that his insanity is more general than it appears.

If the term "monomania" is applied only in this strictest and most limited signification, the number of cases that will fall under this head will undoubtedly be few, but I see no reason to deny that there will be some that can be properly thus classed, and I hold the statement so often made that this condition does not exist, in spite of the high authority of those who make it, to be an incorrect one. It is true enough that in the relation of things one delusion may entail many others, and also that there is often, with an apparently very limited delusional insanity, more or less general mental and moral impairment, but that there may be and are cases in which a single delusion or imperative conception forms the whole of the insanity, either at one of its stages, or during its whole course, I have very little doubt. It is difficult, of course, to demonstrate this to the satisfaction of a determined doubter, as any very slight mental obtuseness or eccentricity that would not in itself cast any shadow, under ordinary circumstances, upon a person's title to mental health might be

assumed as the basis of a claim of such general mental impairment as to remove the case entirely out of the category of monomania, at least in any strict or well-defined signification. A certain degree of dementia, it may be almost said, is normal in the ordinary individual, perfect mental clearness and acuteness are as rare as perfect vision, and it does not seem exactly fair to demand of the average mediocrity what would be, to him, an intellectual hypomania, in order to prove his sanity.

Those, however, who make such persistent objections to the admission of this form of insanity generally base their opinion upon some psychological theory of the unity of the mental faculties and hence the impossibility of partial insanity. But is there any real support for such a theory? We admit generally that a person may have a single hallucination, and this may be the starting-point for an equally limited delusion. Or an idea or suspicion, not necessarily insane in itself, may, under certain favoring conditions, take such hold on the mind that it finally becomes morbid and forms a genuine insane delusion affecting its subject's actions to the extent of making him a decidedly dangerous member of society, and yet without necessarily involving his mental functioning to the extent of making him insane in any direction other than the one indicated. It is not intended to convey the impression here that these are the only ways in which a genuine monomania may arise, there may be others, but that they are possible and actual occurrences in a few cases of insanity. The following appears to me to be an instance of monomania limited to a single delusion arising from hallucination, or it may be illusion, of the senses.

M. C., American, aged thirty-nine, wife of mechanic, was admitted to the Illinois Eastern Hospital for the Insane, June 15th, 1882. She was a well-formed, plump woman, weighing one hundred and forty-five pounds, stature five

feet six inches, and with no special facial or cranial abnormality. The only notable peculiarity was her prematurely gray hair, though she did not appear much older than she actually was. She was the mother of three children, the youngest fourteen years old at the time of her admission. Her menses were still regular, and there was no uterine or other apparent physical disorder. She was subject, however, to frequent attacks of bleeding at the nose, and complained of a "dull" feeling in her head most of the time, but there were no objective signs connected with this symptom. Her special senses were all normal.

There was a history of insanity in her family, her paternal grandfather having died insane, though her parents were both living, and temperate and sound in mind so far as known. The records are rather deficient as to her own previous history, but she had had no previous attack of insanity, and her present mental symptoms first showed themselves about a year before her admission, and at the end of a long spell of ill-health. They consisted in the manifestations of a single delusion in regard to a certain family who were her next-door neighbors at home, and who, she claimed, were constantly tormenting and injuring her and her friends. She had a fair common school education, and could talk reasonably and intelligently upon every other subject but this; but she could not speak temperately when her special delusion was mentioned. She had frequent hallucinations of hearing, all of which she referred to the family mentioned, and at these times she would hide her face, as she claimed that if she looked at any one then he or she would suffer as she did from these enemies. At other times she claimed that they "drew on her lungs," and then she appeared, from her grimaces and semi-convulsive movements, to be suffering actual pain, though she disclaimed anything more than discomfort. Her general disposition was excellent, there

was almost an entire absence of the offensive self-feeling of the insane; she was generous, kindly, and sympathetic, and especially helpful in caring for others sick upon her ward. Even in respect to the family who she thought were injuring her, while she attributed to them almost every bad quality, she never expressed a wish to do them an injury or to do more than obtain their legal restraint. She would not argue about her delusion, but claimed that her own feelings made it a reality beyond question, while on all other matters she was reasonable and sensible enough. The limited nature of her delusion was noticed by all who had to do with her and was a matter of general remark. She was removed by her husband, unimproved, after a few months' residence in the hospital, and at latest accounts is still in the same mental condition as while there.

In the above case we have, I think, an instance of a single delusion originated and maintained by hallucinations, caused by bodily disease affecting an hereditarily unstable brain. The defect of judgment that permitted the patient to accept the hallucinations as realities, and to build up upon them the delusion, does not necessarily imply any general defect of intelligence; I have had sane patients with hallucinations which they told me were difficult at times for them to appreciate as unreal, and which they confessed might readily become the basis of delusions with them. Moreover, it is not an altogether rare occurrence for some unusually vivid dream to mingle with the memories of every-day events, and thus perhaps give rise to those "shadowy recollections" that have puzzled philosophers and poets from classic times to the present. I am acquainted with one individual of average intellect and sanity who states that it was only by a process of reasoning and labored comparison of recollections that he at length convinced himself on one occasion that the inci-

dents of a dream were not actual occurrences in his experience, and I believe Sir Humphrey Davy somewhere in his writings notes a similar phenomenon, if not as actually occurring, as at least possible.

That an excessive dwelling upon a single idea, not in itself an essentially insane one, may so intensify it as to render the one who indulges in it insane and a very inconvenient if not an actually dangerous member of society, need not, I think, be denied, and there is more assumption than is scientifically justifiable in the claim that the person thus affected is insane in other directions than the one in which his disorder is manifest. A man may be perfectly fitted for the position in life in which he happens to be, in every respect but the possession of a single delusion, prompted, it may be, by some morbidly intensified natural feeling. The following case appears to me to be in point:

A. R., American, age thirty-eight, carpenter, a robust, powerfully built man, with no bodily or cranial malformations, with, so far as known, a good physical and mental heredity, fell from a scaffolding a distance of sixteen to twenty feet, striking on his shoulders and back. There were no fractured bones, and he was only disabled by the concussion for a few days. About three weeks later, however, he made an attempt to destroy himself by taking a large dose of strychnia—it is said about ten grains—but was promptly treated and his life saved. This was apparently the first symptom of insanity observed by his friends, and they date his mental derangement from the fall above mentioned. He says himself, however, that this attempt at suicide was made because he was weary of life with the knowledge of his wife's infidelity, which he had had for a considerable time. This seems to have been a pure delusion, from all the evidence that can be obtained, but it gradually became so persistent and predominant,

and was so circumstantial in his mind in regard to certain persons who he claimed were the trespassers upon his family rights, that he became decidedly dangerous and homicidal, and he was finally committed to the asylum at their instance. He had been a temperate man, but after his attempt at suicide he became a rather hard drinker though not exactly a drunkard, and his habits did not particularly affect his making a good living at his trade, that of a carpenter.

When received at the asylum he was in excellent physical condition, was quiet and civil, and appeared to fully understand his situation and why he was sent, though still firmly holding to his delusion. This was so circumstantial and fixed that the hospital authorities took pains to find out whether or not it had any basis of fact, with the result that they became assured of its falsity. His mind seemed perfectly unimpaired in other directions, and his reasoning powers intact. He wished still to support his family, and apparently had a little affection left for his wife, in spite of his belief in her infidelity. As he was an excellent carpenter, after a few months' detention as a patient, during which he proved himself in the main reasonable and trustworthy, he was put on the roll of employés and his name taken off the books, though his mental condition remained unchanged. He still continues in the pay of the asylum, contributing from his wages to the support of his family though he cannot live with his wife, and he seems to fully understand that, with his legal status as an unrecovered lunatic, he is in the best place for himself. He will not voluntarily talk about his particular delusion, though he can be easily drawn to speak of it; while it is as fixed as ever, he seems to understand that his opinions are not held by others, and is not anxious to obtrude them.

This case appears, as far as can be seen, to be one of a single delusion, a monomania in the narrowest sense of

the term, due, perhaps, as his friends believe, to a traumatic cause, which has left no other apparent permanent results. The delusion is in this case a common one, and if his intemperate habits had preceded the derangement, it might have been considered a case of alcoholic insanity. At the present time, however, it has not the special characteristic features of any species of insanity based on etiological considerations; whatever his conduct might have been before coming under observation, his present behavior is not such as would be altogether unnatural were his belief not a delusion but a fact.

In one other case of insanity, apparently restricted to a single similar fixed delusion, this condition appears to be the sole remaining effect of a more general mental aberration. The patient, a Swiss, forty-six years of age, baker by trade, came to the asylum with a very limited history, and while nothing is positively known in regard to his ancestry, it is not improbable that there is in his case some hereditary taint. He had been quite intemperate and had suffered considerably from ill-health, was confined to his bed for a long time, and, it appears, suffered also from business reverses, as these were mentioned as a cause in his papers of commitment. During this time he failed mentally, could not concentrate his attention or sustain continued conversation, and his memory became very weak. This condition became very marked and he developed the common delusion that his wife was unfaithful to him, and was endeavoring to put him out of the way. On this account it finally became necessary to commit him as insane to the hospital. When received, his mental impairment was manifest, but during his stay his mind gradually became clearer and brighter, so that at the present time any general defect to such a degree as to place him much below the average of those in his station in life is not apparent. He still holds, however, the delusion about

his wife, and this seems to be in his case somewhat of the nature of an imperative conception. He will sometimes speak of his wife and family with regard when the subject is first mentioned, and even express a wish to go home and be with them and work for them; but he cannot converse or think long about them without the delusion appearing, and becoming more and more manifest the longer his mind is kept dwelling upon home matters. He is perfectly trustworthy, amiable under ordinary conditions, and industrious, and gives no indications, apart from this one delusion, of being unfitted to enjoy his liberty. As it is, he is a willing resident of the institution, is allowed to go and come when he pleases, and while he occasionally has a little growl about his inability to earn money, he generally appears cheerful and contented. This contentedness in such a situation might, perhaps, be considered a little abnormal unless we are to attribute it to a realization of his mental disability, or rather, perhaps, to that mental and moral inertia that may easily exist in persons otherwise sound when completely provided for and relieved of all the ordinary responsibilities of life. This is not insanity; if it were, then the inmates of many of our public institutions other than insane asylums, as well as many others in general society, are also insane.

I might add something here as to the possibility of a single insane delusion existing alone, being fairly presumable from the best established physiological theories of the functions of the brain. It does not seem to me to be carrying logical deduction too far to assume that the localization of function in that organ may extend even to separate conceptions. The lesions of monomania, as well as those of some of the more pronounced forms of insanity, are not usually pathologically demonstrable, but this is not a fact bearing against the theory above mentioned. We would not expect to find the minute changes in the

ideational cells or connections to be necessarily visible, even if we knew where to search for them.

In what has been said above, I have argued for the existence of monomania as consisting in a single delusive conception. It is not necessary to limit the use of the term to these cases; it is a convenient enough name to cover all the instances of insanity that are characterized essentially by systematized delusions or imperative conceptions, and not involving the mental faculties as a whole. It is essentially a partial insanity in the sense of involving only a part of the mental mechanism and not the whole of it in a limited or partial degree. While there is generally, perhaps, a slight mental weakness with the delusion, this is not a prominent and not the essential feature of the case. But a person whose insanity, however slight it may be, is general, ought not, I think, to be called a monomaniac, and especially is this the case when the derangement is not characterized by fixed or systematized delusions, or imperative conceptions. The ability to reason logically in insanity is not peculiar to monomania; it may exist also in simple melancholia and in the milder form of acute mania, and is even improved in some cases. I have known one case of circular insanity in which the sufferer was in both stages so perfectly conscious of his condition, and capable of correct reasoning and self-control, that he was able to rationally treat himself and keep his place in society and business, so long as I had him under observation. Delusions are, of course, not peculiar to monomania, and it is perhaps open to question whether we are to include under this designation many of the cases of secondary delusional insanity, even when fixed delusions are a prominent feature, though combined with a considerable degree of weakness and confusion of mind. Such cases, however, as the one last reported in the foregoing pages, when they occur, can hardly be called by any other name.

The much discussed mental status of the assassin Guiteau comes very *apropos* in considering this part of our subject. There are, it is probable, very few individuals, even including the prosecuting witnesses at his trial, who would now claim that he was of perfectly sound mind, and the majority would perhaps call his case one of partial insanity, reasoning mania, or monomania. It is probable, as has been shown by Kiernan, that his was a case of what has been called by the Germans "*originäre Verrücktheit*," and "*Verrücktheit*" as used by them includes monomania, though it is a much more comprehensive designation. It includes also a large number of cases of secondary insanity characterized by hallucinations and delusions that are not monomania unless we allow a very wide signification to the term. The original "*Verrücktheit*" of Sander, under which head we might put Guiteau's case, is not exactly a partial insanity such as I understand monomania to be. It seems to me rather to be a general condition analogous to idiocy or moral insanity, as Krafft-Ebing remarks, and I doubt whether it is necessarily accompanied by genuine delusions, hallucinations, or imperative conceptions. Beyond the general one of his own importance which dominated his whole life, it appears questionable whether Guiteau ever had a fixed delusion or any honest delusion at all. His defective mental organization was such that he was incapable of appreciating his own behavior and its consequences, he was thoroughly insane in his judgment, but it seems to me very doubtful whether his vicious day dreams were any more realities to him than to those who heard them told, except upon the principle that a man can tell himself a lie till he comes more or less to believe in it himself. His delusions do not appear to have been permanent systematized ones due to special organic defects, they were rather due, so far as they existed, to his

general condition of mental and moral degeneration and weakness.

I have been led to this view of the Guiteau mental condition by the observation of two or three patients whose cases appeared to me to be very similar to his. The most striking of these is a female, thirty-three years of age, who is said to have a heredity of insanity from several generations of ancestors on the paternal side. Her father, while not insane, is notably eccentric, her mother appears to have been weak and hysterical, one brother has been insane and an inmate of the same hospital as herself. Physically she is undersized and noticeably unsymmetrical, one leg being considerably smaller than the other from paralysis in infancy. She is said to have had convulsions, but these were probably only hysterical, such as she is still liable to have. Apart from hysterical ailments, her health is pretty good, her menses are fairly regular, there is no very marked cranial asymmetry, though her head is slightly depressed in the median line from the vertex to the occipital protuberance, and rather more protuberant in the right parietal region than in the left. There is a certain want of symmetry in her face, especially noticeable in expression, but it is not easily determined by measurements.

She has always been wilful and unmanageable and perverse in her ways since childhood, though her friends were not willing to consider her deranged. She has had a fair English education, has done a great deal of desultory reading, and has a notable facility of expression of a certain sort both in speech and in writing, and a good memory so that she is able to reproduce whole poems in her writing (sometimes altered to suit her ideas) without crediting the authors. She has been, according to her own statements, successively a ritualist, a Catholic, a Presbyterian, a Swedenborgian, and a Congregationalist, and at present she

claims to be again a high church Episcopalian. Indeed, her religious vagaries were the matters that most distressed her friends for many years prior to their considering her actually insane. A year or two before her commitment as insane, she became infatuated with a popular preacher and persecuted him so with love letters and by attempting to attract his attention and obtain interviews with him that the steps were finally taken that led to her being shut up in an asylum. Her committal papers state that her insanity was of twelve years' duration which covers the period of her public eccentricities and her religious wanderings and dates its beginning at her nineteenth year.

After a few months' stay in the hospital to which she was first sent, she was allowed to visit home, but soon had to be returned. During this furlough she absented herself from home and was only found after several days' search by her friends, in the church of her admired preacher.

Since her reception at the Illinois Eastern Hospital, there has been very little change in her mental condition, though what there is has been for the worse. She is capable of talking sensibly and appearing perfectly rational, and has often surprised visitors to the hospital who have conversed with her by her apparent sanity, though there is generally something fantastic in her dress or manner which, seen in such a place, makes her appear conspicuously insane to the casual observer. She delights in getting up oddities of costume, especially when she has a chance to display them in public, as at chapel services, entertainments, etc., and when not allowed to rig herself out too conspicuously, will have at least some fantastic embroidery or other striking peculiarity in her dress. In fact, her behavior generally is marked by a desire to be noticeable in some striking way, and she is never better satisfied than when she feels that she is producing a sen-

sation. There is a strong erotic tendency; she is very much inclined to write very ardent letters to some male individual with whom she may perhaps have no personal acquaintance whatever, and, judging from her talk at times, her feelings in this direction are not always purely romantic. She is a very troublesome patient in some respects, and seems at times to endeavor to be as irritating as possible to attendants and those about her. While seldom or never violent, she can make more ingeniously insulting remarks to and about her attendants than any patient I have known, and utterly disregards all the conventional proprieties of language in so doing. On this account, she seldom is kept long in any one ward, as an occasional change seems to improve temporarily, to some extent, her too trying disposition.

The point, however, in her case which is of most interest here is in the character of her apparent delusions. I say apparent, for their unreality to her is manifest at times to any observer. There is nothing fixed or permanent about them; at one time, she is to be the mother of a coming Messiah; at another, she is heiress to the British crown; and, again, she claims to rule the American people as queen; and next she will laugh at her own notions, and admit that they are absurd. She will write a most loving letter to some man who is at the time the object of her affections, and then write one in reply to herself, addressing herself as "My loving wife," etc. Her inability to live altogether in the unreal world she pictures for herself in her day-dreams, and the conflict between them and the realities she appreciates about her, will probably account for much of her discontent, and help to explain some of her worst behavior. These day dreams, though not realities to her, yet dominate her whole thought and intrude themselves into everything she writes, though the mental friction of conversation appears to enable her to

often talk at length very sensibly on almost any subject with which she is at all conversant. She is conscious of her own mental weakness, and when asked recently what she soberly thought of her own case, she replied: "I am not exactly insane; I am only a sort of an imbecile," and then, apparently wishing to modify the admission she had made, she added: "but you know the foolish things of this world are to confound the wise." It is not often that she will acknowledge as much as the above, though she frequently admits that her pretensions are ridiculous, and that her behavior is unreasonable.

If this patient had been of the opposite sex, and had had the training and experiences of a man, it is probable that the development of her insanity would have been somewhat different, and I can readily imagine that under such conditions she might have been another Guiteau. They are alike in their bad heredity, their overbearing egotism, their peculiar religious and erotic tendencies, their ability to deceive as to their real mental status, and, I believe, they both had the same type of pseudo-delusions.

Dr. Spitzka, in his excellent work on insanity, includes these cases under the general head of monomania, and has proposed for those forms in which fixed delusions or hallucinations are wanting the name "*monomania sine delirio*" as bearing the same relation to monomania with delusions that simple emotional melancholia bears to the full-fledged delusional melancholia, or hypomania to typical mania. But these are the milder forms, and generally the incipient stages of typical mania and melancholia, while typical monomania, as in the cases first described in this article, whether characterized by hallucinations, delusions, or imperative conceptions, appears both pathologically and clinically to be a much more simple form of insanity than original or congenital "*Verrücktheit.*" The latter is a general affection involving the whole intellectual life, due

usually to marked structural or teratological defects, and tending toward imbecility, one type of which it may be said to be, while the former is an exceedingly partial intellectual derangement accompanied, it may be, by no detectable structural change, and without any necessary tendency to dementia, as is shown by the history of some most illustrious men who have been at times in their lives the subjects of limited delusional or hallucinatory derangement. A man may become a monomaniac by dwelling too much on a single idea or set of ideas, by some local morbid excitation of the sensorially functioning regions in the cerebrum, or by a too great sensitiveness to the morbid impulses to which even sane individuals are liable; but no one can become the subject of original "*Verrücktheit*" without such a primarily defective organization as renders the growth of his disorder an essential accompaniment of his mental and physical development.

A strict definition of the disease according to the views stated above would perhaps be as follows: Monomania is a partial insanity consisting essentially of delusions or imperative conceptions, and not necessarily affecting the general intellectual or emotional life except in the logical outcome of these. This does not exclude the possibility of a certain degree of mental weakness co-existing with the delusions; indeed, this may be generally the case but it is not an essential feature of the disease. For practical purposes, however, it may be well to allow a broader definition, and to include even cases like the one last described under the head of monomania. "*Verrücktheit*," as usually defined by German authors, is essentially a delusional insanity, and yet they include these cases under that designation.

COMMUNICATED INSANITY.

BY

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UNDER this title may properly be comprehended the various types of that phase of mental aberration known as *folie à deux*. It has long been recognized by alienists. Berlyn[1] reports the case of a son who imbibed a hypochondriacal delusion from his mother, who formed the delusion in consequence of an injury. Falret and Laségue[2] claim: First, that in ordinary conditions mental contagion does not proceed from an insane person either to a sane or to another insane individual. Second, that contagion is only possible in exceptional instances. Third, that these latter are divisible into two great classes: (*a*) In *folie à deux* one of the patients is an active, the other a passive recipient. The active agent creates the delusions and imposes them on the other who receives and submits easily to his influence; but in time the delusions as accepted by the passive patient react on the other, and are in a modified condition accepted and proclaimed by others as true. (*b*) For the same intellectual delusions to occur in two individuals, they must have been subject to the same influences and lived a long time together. Fourth, all cases observed have presented the same symptoms, and have only developed under circumstances such as those described. Fifth, this form of insanity is more common

[1] Zeitschrift für Psych. Aerzte, ii., 1819.

[2] Annales Médico-Psychologiques, tome xviii., p. 321.

among women than men. Sixth, the patients may be related, but more frequently are not. Seventh, the chief point in treatment is the separation of the active individual from the other. Eighth, the passive individual usually recovers first. Ninth, delusions may be communicated from a second to a third, and so on to several individuals, but this rarely happens. Separation is the chief means of treatment.

Needham[1] has had under observation two brothers who had the same delusion; in consequence of which delusion one of them committed suicide. Savage[2] reports the case of an insane father who communicated his delusion to his son, and later to *his son's* wife, who was sane but stupid.

Morandon de Montezel[3] claims that there are three forms of this condition: *Folie imposée*, where an insane person imposes his insane conceptions on an insane person intellectually feebler; *folie simultanée*, where two persons hereditarily predisposed contract the same type of insanity simultaneously; and *folie communiquée*, where an insane person communicates his insane ideas to another person hereditarily predisposed to insanity. Here there must be a well-marked hereditary predisposition in the passive party to whom the disorder is communicated, an intimate association between the two persons, and incessant action by the lunatic on the mentally sound person to make him accept the delusions and hallucinations of the former.

Kiernan[4] says that "there is no essential relation between the *folie simultanée* and the other forms. The essential feature of a *folie à deux* is the communication of ideas, not the communication of the same type of insanity. He

[1] Journal of Mental Science, January, 1881.
[2] Journal of Mental Science, April, 1881.
[3] Annales Médico-Psychologiques, January, 1881.
[4] Journal of Nervous and Mental Diseases, 1880.

thinks that therefore the term *folie simultanée* as a designation of a type of *folie à deux* should be abandoned. Tuke[1] is of like opinion, while Régis[2] and Seguin[3] claim the legitimacy of the term. The last reports two sisters who became insane, but Seguin's histories show that this was a mere coincidence, and the same may be said of the cases of insanity in twins reported by Gill[4] and Savage.

Kiernan cites the following cases:

A Presbyterian clergyman who had strong hereditary taint, was admitted to the asylum at intervals from 1872 to 1876 and discharged during periods of comparative lucidity, the contrast between which and the markedly insane period was very well marked. In the comparatively lucid period he was polite, unassuming, unobtrusive, and a pleasant companion; in the other conditions he was inquisitive, familiar, obtrusive, given to very loud talking, and had marked insanity of manner. His correspondence then displayed all the peculiar punctuation and emphasis common to the chronic insane, together with a great superabundance of adjectives and a marked attempt at frequent alliteration. In 1874 he came on a visit to the asylum, filled with ideas of ameliorating the condition of the patients, and, above all, of improving their intellectual capacity by means of a lecture on the Holy Land. He was then clearly in his insane period, and displayed his restlessness, obtrusiveness, and peculiarities common to him at that time. But the interest in the case lay in the companions by whom he was accompanied, all of whom were permeated with ideas of a delusive character, based on the improvement of the insane and the conversion of them into useful members of society, of almost the same

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[1] Journal of Mental Science, January, 1880.
[2] Cited by Montezel, op. cit.
[3] Archives of Medicine, 1879.
[4] Journal of Mental Science, January, 1883.

character as the ideas of the minister. The first was a general paretic, one of those wandering cases who come to the front when any popular uprising happens. This individual had been to Cuba, and had claimed to have a colonel's commission in the Cuban republican army. Somewhere he had met the minister, who obtained an ascendancy over him, and his mind was thoroughly permeated with the schemes of that gentleman. He attempted to ameliorate the condition of the insane by purchasing five dollars' worth of red and blue lead pencils, and distributing them among the patients and attendants. The second member of the group was a case of chronic mania with imbecility, who was very religious, and full of the ideas of serving God by ameliorating the condition of the insane. The third individual was a case of hebephrenia, who mingled in his conversation religion, regrets at his having been addicted to masturbation, and the delusive ideas already alluded to. The fourth presented a similar form of insanity to that of the minister, but shading into dementia. He was thoroughly dominated by the ideas of the former. The fifth member of the group was an epileptic, slightly demented, but swayed by the same dominant ideas. When again a patient, the minister displayed great power of collecting similar groups.

Two cases of monomania accepted each other's delusions: one that he was God the Father, the other that he was the Holy Ghost. Another case of monomania was able to communicate his delusions that he was God to a hebephreniac, and accepted from the latter the delusion that he was the Holy Ghost. An imbecile, overcoming the monomaniac in a squabble, claimed henceforward that he was the great god who had beaten the little god. A brother and sister interchanged delusions of persecutions.

Kiernan also cites several instances in which paretic dements accepted each other's delusions.

Reverchon[1] and Pages cite the case of a family who became insane in consequence of the use of medicines administered by a quack, all of whom manifested the same delusions and hallucinations. Lehmann[2] cites the case of two sisters who became simultaneously insane, one with a chronic, the other with an acute type of insanity: the latter imbibed the delusions of the former. Hammond[3] cites the case of the Dubourques; the father formed the delusion and imposed it to his son, who was of feebler mental capacity.

Certain recent cases, however, deserve more attention than they have received, and it is my purpose to pass these in review and to examine the mechanism of this condition.

Epidemic insanity attacked a whole family residing in my own vicinity, and was under the care of Drs. Cunningham and Davis. The family consists of W. H. Hicks, a laborer, aged forty-four years; Hester, his wife, aged thirty-seven, and eight children, the oldest being Lorenzo, aged eighteen; Laura, sixteen years of age; Mary, fourteen; Lena, twelve, and so on down, with two more boys and two girls, to a babe of fifteen months; the parents are below the rural standard of intelligence. As it was rumored the whole family were insane, the city authorities deemed it prudent to make an investigation. Mrs. Hicks was found insanely singing, preaching, exhorting, and anointing the entire family with salt-water, claiming that she had received a revelation from Jesus Christ, who was soon to marry her daughter, and that she was cleansing the family from sin, so that all could accompany the bridal party to their home in heaven. Hicks had accepted the delusion, as also had Lorenzo, the oldest boy. Laura was found in bed, raving, bathed from head to foot in salt-

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[1] Annales Médico-Psychologiques, July, 1882.

[2] Archiv für Psychiatrie, Band xiv.

[3] American Journal of Neurology and Psychiatry, February, 1883.

water, and suffering from a high fever, while the other children, with their ears, eyes, and nose stuffed with salt, and almost skinless from excessive rubbing about the arms and face, joined in the shout for Jesus, and barred the doors against the feared approach of the devil. It seems that Laura, who is the strongest-minded member of the household, had contracted typho-malarial fever while living in another family in the city, and upon being taken home manifested the psychical phenomena resulting from exhaustion, of which Von Voigt[1] speaks; the hallucinations relating chiefly to religion, and there being incoherent remarks about the bride of the lamb. The attendance on this daughter and the delirious ideas expressed by her resulted in driving Mrs. Hicks insane, who, being allowed for several days to preach and exhort, so excited the rest that, in consequence of this and continued insomnia, they lost their wits.

This family recovered from the insanity on being separated, properly fed, and their insomnia relieved; the delirious sister recovered under tonics. In Schuyler County of this State, a new sect has been formed by an epileptic who has succeeded in imposing his hallucinations on a number of people hitherto regarded as sane. The general tenets of this sect resemble those of the Oneida Community. There have been a number of faith cures performed by them.

In California a case of primary monomania succeeded in imposing his delusion that he was a Spanish prince on his wife and sons, who compelled people to do homage to him, and nearly killed a tax collector who called, for treating their sovereign with such indignity. The tax collector was allowed to leave only after humiliating himself greatly. In the case of Freeman, of Po-

[1] Allgemeine Zeitschrift für Psychiatrie, Band xxxix.

casset, Folsom[1] states that his delusion was shared by his acutely insane wife and fifteen of the sane Second Adventists. The latter were accustomed to Freeman's domination and accepted his ideas. His acutely insane wife accepted his ideas with even more credulity.

The *Lancet*[2] has reported epidemic delusions in one of the valleys of the Italian Alps. The people of the valley are so remote from the outer world that they are still steeped in mediæval notions. Intermarriage is the rule, idiocy, deaf-mutism, epilepsy, suicide, and other manifestations of degeneracy are extremely common. In such a population the soil is prepared in which extravagant emotion can flourish into frenzy. After a prolonged drought of February, 1881, a villager declared that he saw water flowing on the face of the saint pictured on a chapel. His hallucination was at once shared by the crowd, and the miracle was attributed to the intercession of a girl who formerly suffered from epilepsy. She was the subject of an excessive religious mysticism, accompanied by hallucinations and delusions. Her frenzy was caught by her father and brothers, and also by strangers.

The Lay case which occurred in Sandwich, Illinois, was as follows: The mother of the family, who comes from a decidedly neurotic stock, had for a long time displayed peculiar religious ideas, claiming to be inspired. About December, 1880, the Lays began talking their pecular doctrine in State Center, Iowa, and had trouble in the Presbyterian and Methodist Protestant churches, to which they belonged. The town finally became so 'hot' for them that they were compelled to leave and returned here, their old home, leaving their large property in Iowa because of the public indignation at their 'blasphemies.' In April, 1882, the mother had it revealed to her by God that she was

[1] Boston Medical and Surgical Journal, March, 1880.
[2] January, 1882.

to give birth to the Saviour, and that she must fast forty days to prepare for it. Her husband and son must watch her constantly so as to be ready to receive the Saviour. The father, who is about fifty years old, is quite wealthy, and during many years' residence in Sandwich held a high place in public estimation. He is sane, but he aided and encouraged his wife in her suicide by starvation. Bert Lay, aged twenty-one years, is a firm believer in his brother W. K. Lay's inspiration from a divine source. Roy Lay, aged twelve years, is a weak little fellow who has "divine instruction," been compelled to go hungry, locked up in a room most of the winter. Mrs. Lay said she had been 'told' to starve the boy. Some days 'instructions' came that Roy must have no dinner, again that he must have no meat, again nothing but an apple, and so on through the list of articles used for food.

In consequence of the rumors about the fast the mother's brother went to see her. All the answer he could get from her was, 'I have been told to do it—I must fast,' and then she added; 'Better for me to do it than disobey.' She received her commands from the Lord. She told him Will was a prophet. He spoke to her husband about the matter, wanting the fast broken, but got no encouragement. He told them his sister would starve to death; that there was danger in eating heartily after a prolonged fast. Finally he visited the house, determined to put an end to the fast, and for that purpose had some beef-tea prepared. He tried to feed it to his sister, but she refused to swallow it. At that time he heard the death-rattle in her throat. Will Lay came in and said: 'We are prophets—true prophets. You get information from lying spirits. You said that my mother would eat and die.' More of a similar character passed between Will and him. The sister said, in a faint whisper: 'I have been told not to eat. It will be better if I don't than if I do.' He caused an autopsy to

be made which showed that there was no evidence of pregnancy and that death resulted from starvation.

The mental condition of the son Will, who is twenty-one years old, can readily be seen by the following interview with him: "Are you the prophet Elijah, performing anew the work now recorded in the Bible?" he was asked within two hours of the burial of his mother. The young man looked his questioner square in the eyes, and answered: "My mission on earth is devoted to the work of Elijah, Joshua, and Zerubbabel. I was commissioned for the task by the most high God, our father and director. I have had many inspirations direct from God, and the proof has been multiplied one thousand times. About eighteen months ago I wrote one thousand lines of blank verse in about four days, in token of the one thousand years Christ is to rule the earth after his second coming. I firmly believe mother, buried to-day, conceived the second Christ."

"But the post-mortem examination abolishes even the possibility of such a thing," was urged by his questioner.

"The act was God's, and no earthly science could disprove it. The child Christ was conceived by my mother. Within two weeks she has been examined by a party well posted in such matters, and the result of the examination was most definitely ascertained. The child was there, and it was a male child, and Christ."

"How do you account for all traces having disappeared when the doctors held the post mortem?" was then asked.

"The dragon was present at the death of the body ready to devour the child, and it was borne up to heaven. My mother's belief, maintained by myself, was based on the twelfth chapter of Revelations. It is recorded there that a great wonder appeared in heaven—a woman clothed with the sun, the moon under her feet, and twelve crowns upon her head. She was about to be delivered of a child

when a great red dragon, having seven heads and ten horns, and after casting upon the earth one-third part of the stars, he stood before the woman ready to devour the child. She brought forth a man-child who was to rule all nations with a rod of iron, and the child was caught up into God and to his throne. The woman then fled to the wilderness, and there God fed her 1,260 days. The dragon was the devil, and he was cast out of heaven by Michael and his angels. The woman was given the wings of an eagle, and in vain the devil attempted to devour her. My mother met the fate of the woman mentioned in the Bible. I believe that within ten days my mother and her sister, Maria—dead many years—will be resurrected, and then Christ will appear. I have had instructions from God on this point, and I have faith that all will come out as I have prophesied. I shall stay in the vicinity of the cemetery until June 1st, and if nothing transpires I shall give up the work and settle down to preaching or in commercial business. I am a graduate of the Adrian (Mich.) Protestant Methodist church and may adopt the pulpit as my profession. About twelve years ago my mother had a prophetic dream, in which she was directed to dedicate herself and her children to God, and she did so. I had a similar dream, when I began writing the 1,000 lines referred to, and when I began receiving my prophecies from God. I have tangible evidence of my mission. For instance, I have been cured of a chronic disease by God, and am to-day in full possession of health and all my faculties.

"My mother has had evidence piled mountain high. She was directed by God to fast forty days, and at the end of that time she was told Christ would be born to her. She died, it is true, but not of starvation, because she maintained her precise weight through her illness. A pain in her left side caused death. But there is another cause. She had instructions from God to fast forty days and

warned that friends would come to her and make her eat, and that if she did eat she would die. It came true. My mother's brother went to her and compelled her to take some beef-tea. She died that same night. During the first three days of the fast, when her heavenly instructions to others were not carried out, she became very hungry; but as soon as the acts commanded by God were performed her hunger ceased. She received instructions to send for J. J. C., of Hannibal, Mo., a man of God. The letter was written by my father. But he delayed in mailing it. Immediately my mother's hunger came on and she said: 'Something has been left undone that God commanded done.' My father then started to the post-office to mail the letter to Mr. C., and my mother was satisfied and her hunger ceased. Then, again, my younger brother, Roy, was sickly, and God told mother when Roy would be worse, and when better, and it always came to pass that way. Roy was used as a means of shriving the family, and that to gain this absolution the boy was frequently asked to fast. People say a great many things. I do not expect less of abuse and misunderstanding than was heaped on the prophets of old. Every true prophet has hard trials. I am a true prophet. I am so instructed of God.

"I believe that inspiration comes from two sources —God and the devil. God and his angels perform the righteous work of the world; the devil and his agents perform the devil work, which is called spiritualism. I have had many calls from the latter power and know it to exist. I have been warned that evil spirits were attempting to turn me from my work. But I overcame the temptation. I am a prophet, and the spirit of prophecy is in me. I knew all about the present Jewish exodus long ago. It is the old exodus over again. I edit and publish *The Prophet's Warning*, at Adrian, Mich., and in it I spread my

heaven-sent prophecies, and I have been pronounced in other publications a prophet of God. I am also a licentiate member of the Methodist Protestant conference of Iowa. I claim the United States to be the gathering place of Israel, preparatory to the reign of Christ for 1,000 years. They are coming in crowds from over the sea. The end draws near. My mission covers three periods of about one year each. The first period began November 15th, 1880, and was devoted to my preparation; the second closed probation and includes such events as are connected with the revival at Jerusalem. At the end of the third period Christ will come. I was inspired when I wrote 'Heaven's argument,' of 1,000 lines. If I was not, I could scarcely produce such a gigantic composition in four days. I entered on my mission as a prophet Nov. 10th, 1880, I was residing at State Center, Iowa, with my parents, at that time, and was studying my lesson review preparatory to going back to school at Adrian. On the night of Nov. 10th I was attending a ball at Manwarring's hall, when the Lord sent a message to me, to be delivered in the ball-room. I trembled and went away without obeying. He came to me again and stopped me, said that I must go, that the people would call me insane, but that the Lord would lead me out into great blessing. The message was as follows:

"'STATE CENTER, Nov. 10th, 1880.

"'*To Church Members in Attendance at the Dance at Manwarring's Hall:* I was present at the prayer-meeting this evening at the Presbyterian church. Subject at the meeting was, 'How Shall We Labor to Bring About a Revival?' As you were absent, I send you word that I wish your co-operation. On with the dance! Let joy be unconfined! But remember that for these hours when I

need your help, My Father will bring you into judgment.

(Signed) LORD JESUS CHRIST.

W. K. Lay, Amanuensis.'

"I was refused permission to read the above, and the manager did not even read it before decision. But I printed it in the State Center *Enterprise*. I realized that the angel had led me into difficulty, and immediately heard that over-study on religious subjects had driven me crazy, when the facts were that for four months, ten to fifteen hours a day, I had been assisting my brother in his warehouse. I was very much worried for two or three days, and it took me nearly two weeks to realize that I was talking and acting as a prophet. Then the mystery of the seal which is to seal the 144,000 was revealed to me. Should mother not be raised from the dead, I will abandon this thing and think no more about it I am not insane, and do not propose getting into an insane asylum."

These ideas are still retained by Lay, and the non-appearance of the Christ accounted for in a new way. He has had one hallucination since which he claims is clear evidence that his mother was raised from the dead. The father no longer accepts the insane ideas of his son, but the other brother does; both imitation by the mother and domination by her played a part. It is obvious that among the paretics cited imitation was the great factor.

MEDICO-LEGAL ASPECTS.—Kiernan[1] calls attention to the fact that it is by no means improbable that, as has occurred in Germany, the communicated delusions of lunatics may become the subject of legal investigation as furnishing seeming evidence of conspiracy. He also states that it was only an accident which prevented a second Guiteau trial with more striking accompaniments during Hayes'

[1] Alienist and Neurologist, April, 1883.

administration. Meyers, a self-announced prophet from Illinois, like Lay, set out to kill President Hayes. Arriving in Washington he recognized a man as the Angel Gabriel, who luckily was sane and strong-minded, and to whom he announced his intention to kill President Hayes. Had this "Angel Gabriel" been a lunatic of feeble intellectual capacity, he might have accepted Meyers' plans and aided in place of thwarting him.

From what does the acceptance of insane ideas arise? Hughes,[1] Lehman and Montezel[2] claim that it arises from a morbid tendency to imitation. That this plays an important part there can be no doubt. The passive recipient is not purely a passive recipient, but is swayed by a morbid propensity to simulate what seems striking. There is, however, another very potent factor. As a rule the person who imposes the delusions is intellectually the ablest and accustomed to dominate, as in the case reported by Hagen, where a sane stupid mother regarded her son's delusions of persecution as true, but ascribed to sorcery; in which event the delusions are accepted by the recipient as true to avoid the trouble of reasoning, to which trouble the average human being is much averse, or the delusions are agreed to to avoid annoyance, as in the case cited by Spitzka[3] of a puerperal lunatic who claimed to be a princess, and when a secondary case of insanity claimed to be her mother the queen, accepted this claim to avoid annoyance. In the Freeman and Lay cases the element of domination is strongly evident. Taking all the cases cited into account it may be concluded that: First, imitation by the passive recipient and domination by the creative personage both play parts in the production of

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[1] Alienist and Neurologist, July, 1883.
[2] L'Encéphale, No. 1, 1882.
[3] Insanity: Its Classification, Diagnosis, and Treatment.

communicated insanity. Second, that at some time it may be found but just to examine the mental status of alleged conspirators from the standpoint of "communicated insanity."

INSANITY AND CARDIAC DISEASE.

BY

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THE relations between insanity and cardiac disease are, like the other somatic relations of insanity, threefold in character. The cardiac disease produces insanity; it is affected by insanity, and it affects pre-existing insanity. The first question naturally arising for consideration is the influence of cardiac disease in the production of insanity. This was much over-estimated by Nasse[1] and the earlier alienists. In a general way it may be said that the types of insanity resulting from cardiac disease are usually characterized by depression and emotional disturbance.

Griesinger[2] says that a certain etiological influence must always be attributed to cardiac disease, but there is no special frequency in the occurrence of this influence. Luys[3] says that the symptoms of the psychoses arising from cardiac affections are excitement and loquacity followed by more or less prolonged somnolence. In certain cases when the cardiac affection shows itself in periodic attacks of dyspnœa with extreme respiratory anxiety, there is an equal periodicity in the appearance of psychical symptoms which show themselves at the height of the respiratory anxiety and disappear with it. Hertz[4] has had similar experience.

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[1] Zeitschrift für Schweizer Aerzte, 1818.
[2] Mental Pathology and Therapeutics.
[3] Maladies Mentales.
[4] Thèse de Paris, 1877.

Burman[1] concludes from an examination of a large number of cases, that the psychoses most commonly resulting from cardiac disease are associated with depression and hypochondria.

Savage[2] finds depression to be the prevalent type. Solfanelli[3] believes that the type of insanity due to cardiac disease does not present any special features. Dickson,[4] says that in his experience mitral imperfection sets up a transient lypemania; aortic disease a more permanent type. Witkowski, Dofour,[5] and Leidesdorf express similar opinions.

D'Astros,[6] like Dickson, claims that mitral and aortic disease produce different psychoses. The patients with aortic disease display very frequently an extreme impressionability, a variable, capricious and fantastic character, an exaggerated susceptibility; in short, marked mental and emotional mobility. The patients with mitral lesions are more self-contained and reticent. They are more or less depressed, and manifest a *tædium vitæ*. They are passive, taciturn, and at times plunged into extreme depression. Aortic affections have occasionally produced symptoms allied to those of senile insanity. Acute mania sometimes results from mitral disease. Psychical phenomena sometimes appear at the period of asystole. These generally consist of hallucinations or *raptus maniacorum*. D'Astros reports one case of katatonia resulting from cardiac disease.

Sioli[7] has observed cases of frenzy to result from ulcerative endocarditis. Sibson[8] reports eleven cases of insan-

[1] West Riding Asylum Reports, 1873.
[2] Journal of Psychological Medicine, 1877.
[3] Archivio Italiano per la Malattie Nervose, 1873.
[4] Medicine in Relation to Mind.
[5] Annales Méd. Psych., tome ii., Serie V.
[6] Journal de Médecine et de Chirurgie, May, 1881.
[7] Ibid., Band xi.
[8] Reynolds' System of Medicine.

ity which came on during an attack of rheumatism when the heart was attacked. The chief psychical symptoms presented was depression; sometimes the patient was taciturn; sometimes having hallucinations and sometimes displayed lypemaniac frenzy. Morel[1] states that he has observed in patients attacked by paroxysmal dyspnœa resulting from cardiac disease the periodical return of strange ideas, hypochondriacal sensations, and hallucinations of a depressing nature. Kräpelin[2] states that disease of the heart exerts a peculiar influence on the types of insanity which occur during acute rheumatism.

Spitzka[3] states that the view, that cardiac hypertrophy of the left side with aortic valvular lesion is more apt to be associated with maniacal conditions, and cardiac hypertrophy of the right ventricle with mitral valvular lesion with melancholic states, is supported by too few observations to merit acceptance; the blood pressure in recorded cases was not registered, hence these are destitute of value. The heart has important and direct relations to the brain and it is very likely that just as disturbances of the vagus innervations are responsible for the raptus melancholicus—in other words just as a disordered state of the brain reacts on itself through the medium of the functional cardiac influence it produces—so a valvular lesion may directly influence the emotional states without pre-existing brain trouble. . . . It is a fact that patients suffering from cardiac lesions are more likely to develop anxious and suspicious delusions than those of an opposite nature. Forbes Winslow[4] expresses similar opinions.

The following case came under my own observation: Jno. F. McK., æt. forty, intemperate, a pauper work-house

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[1] Traité des Maladies Mentales.
[2] Archiv für Psychiatrie, Band xi.
[3] Insanity: Its Classification, Diagnosis and Treatment, p. 375.
[4] Obscure Diseases of the Brain and Mind.

man employed about the asylum, was attacked by acute articular rheumatism, which, however, presented nothing abnormal for about two days, when his temperature rose suddenly to 106° F., falling on the same day to 99°, but followed by endocarditis, after the pronounced symptoms of which the patient complained of being poisoned, and said that workhouse women entered his room to stick pins in him. The patient was at length committed to the asylum and placed under ℞ Kali iod., Kali bromid., Ex. fl. conium, Vin. colchici, āā 8; Aquæ, q. s. ad 96. M. ʒ ss. omne tertia hora. The influence of the cardiac affection seems clearly demonstrable in this case. That cardiac disease has produced maniacal symptoms has not been my experience. Depression has been the only type, and this seems to have been the experience of the majority ; the value of the cases alleged to show maniacal tendencies is seriously impaired by the circumstance alluded to by Spitzka, and by the fact that *frenzy* has too often been mistaken for *mania.*

When cardiac disease affects a patient already the victim of insanity, it has been found by Burman [1] to produce sullenness, moroseness, and, from my own experience, I can add, suspicion. Mildner has reported a case in which a patient of limited mental capacity, who suffered from aortic insufficiency, suffered also from paroxysmal attacks of furor of cardiac origin. It is clear, moreover, from the nature of the influence of cardiac disease in the production of insanity, that its influence on pre-existing insanity would, as Burman expresses it, furnish a rich pabulum for delusions.

In illustration of the influence of insanity on cardiac disease, I shall cite at length the following case of katatonia: T. R., aged thirty-six, policeman, single, common school education, intemperate, as were also his parents.

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[1] Op. cit.

The patient had been a masturbator, and had indulged in sexual excess. He was at first melancholic, subsequently maniacal, but recovering therefrom became what his fellow-policemen called "stuck up." His temper changed from good humor to irascibility, and asylum treatment was at length rendered necessary. He was admitted to the New York City Asylum for the Insane, March 17th, 1873. A week previous he had gone to church, but soon returned, saying he had been followed by "droves of dogs." He was a tall, powerful, good-humored man, and though he had asserted he would not commit suicide, he had cut off the tip of his ear in an attempt of this kind. He was somewhat subdued in manner, and had hallucinations of sight and hearing. The day previous to admission he was affected with spasm of the muscles of the extremities.

Five days after admission he manifested a delusion that he had committed a great crime, and refused food, but said: "This is not a penance for the crime." He required artificial feeding for three days, took food voluntarily on the fourth, and again refused it on the fifth day. A period of excitement then occurred, and he became a subject of hallucinations differing from those he had on admission. After treatment a short time with opium and hyoscyamus he grew quiet and took food voluntarily but very suspiciously. In about a week after, a spasm of the muscle of the neck, followed by slight unconsciousness and slumber, occurred, the pupils dilating widely, and so remaining for a few days.

Two weeks after he had very sluggish movements of the lower extremities, bearing a suspicious resemblance to functional paraplegia, but this was really an *incomplete* cataleptoid condition, involving also the muscles of the neck and upper extremities. The patient opened his mouth, and performed other simple actions of that nature;

these, however, were not ideational, but sensory-motor acts, as his attention to the subject was nil, and he was in a peculiar emotional state. That all the mental faculties were not in abeyance was shown by the fact that he involuntarily raised his hands in an attitude of supplication, or as an acknowledgment of a favor just received. His pupils responded to light, and the organic functions were performed as usual.

This condition continued for three days with very little change, except that when asked to perform a simple action the request would be obeyed, and the action continued indefinitely in an automatic way.

Five days after the beginning of the condition just mentioned, the patient had a rapid, feeble pulse, the beats of which ran into each other and did not correspond with the heart's action, which, though rapid, was otherwise normal. His eyelids and lower extremities soon became œdematous, and the cataleptoid condition disappeared. The heart's action grew more irregular, the *first sound alone being audible*, and accompanied with a *loud, blowing murmur* heard at the base. Pulse 132 and more rapid in the neck than at the wrist; respirations were increased, the respirations were increased, the lungs and temperature being normal. The heart's action soon returned to its normal condition, and the murmur disappeared. The treatment was directed to the alimentary canal only.

The patient then became entirely unconscious as to his surroundings, though taking food and performing other actions involving only the organic functions normally, and so continued for about a week. He then began to have tonic contractions of the muscular system, followed by lessening of the œdema, which finally disappeared. The cataleptoid condition then returned, and was accompanied by considerable waxy mobility. Two days after, his muscles were extremely rigid, and he remained apparently

unconscious for some time. One morning he suddenly spoke, and being asked his reason for not speaking before, said, "They told me not to," and when asked who told him not to, replied, "God and others," and began to weep.

The following day he had a return of the cataleptoid condition, in which he remained for some time. These alternations continued for three months, when he became suddenly violent, tore off a bar from the window, and tried to make his escape. This excitement continued three days, the patient then passing again into the cataleptoid condition, on emerging from which he was markedly dignified, and very formal in conversation. This manner of speaking and acting continued for three months. He then had another cataleptoid relapse, succeeded by an attack of melancholia attonita. Then followed a condition during which his pupils at first contracted and then dilated, his left hand contracted firmly, and from it a quivering motion extended over the left side, and gradually involved the entire body. The irregularities of circulation formerly observed once more appeared, and as before went away without special treatment.

Melancholia attonita became the predominant condition, accompanied, however, by increased susceptibility to external influences. This remained four months, and was followed by a cataleptoid condition with much waxy mobility. While in this state he was found to be developing phthisis. The disease ran a rapid, somewhat irregular course, terminating life July 22d, 1875, twenty-six months after his admission to the institution.

The details of the post-mortem were as follows: Thoracic cavity: lungs the seat of tubercles, some undergoing softening, others calcification; remains of old adhesions in the pleuræ. Heart normal. Abdominal cavity: liver slightly cirrhotic; kidneys normal; the mesenteric glands

tuberculous, and undergoing same changes as the lungs; spleen congested and somewhat enlarged; the intestines somewhat congested and inflamed. Head-scalp thick; cranium normal, with the dura-mater adhering to it in patches. There were firm coagula in the veins and sinuses. The arachnoid, especially over the fissure of Sylvius, was very opaque; the pontico-chiasmal lamina very dense, and a pseudo-membrane was found beneath. There was dulness of the membranes of moderate character between cerebellum and medulla oblongata. Epithelial granulations present in a rudimentary condition, pia-mater removable from cortex except over frontal lobe. Cortex pale, a decided sinking of the surface of certain gyri below neighboring convolutions. There was a fusion of the opposite sides of the anterior cornua of the lateral ventricles. Cysts of the choroid plexus were also present.

Griesinger[1] states that in conditions of exaltation murmurs, particularly of the aortic valves, are very frequent without coincident valvular lesion. He also states[2] that observations in the Vienna asylum show that during maniacal conditions the heart sounds are indistinct during great excitement, and become clear when calm sets in. Fothergill[3] has found that the aortic second sound is accentuated in paretic dementia.

It will be obvious that in these last circumstances we have the explanation of the comparative frequency of cardiac lesions found on autopsy of the insane; these being the result of insanity in many instances, rather than *vice versa*.

It will be easily seen what a complicated question the etiology of insanity is, even when studied from the standpoint of the patient, not from friends' statements, and the

[1] Wiener Bericht, 1858.
[2] Mental Pathology and Therapeutics.
[3] West Riding Asylum Reports, 1873.

important source of error in the autopsy results is also seen. There, as elsewhere, the existence of a vicious circle (so carefully pointed out by Spitzka) is demonstrable. The cerebral condition produces a cardiac affection which in turn modifies the cerebral condition.

Taking all narrated cases into account, it would seem justifiable to conclude: First, that cardiac disease produces psychical symptoms; depressions and hallucinations as well as delusions. Second, that cardiac disease may modify coexisting insanity. Third, that insanity may produce cardiac symptoms.

THE RATIONAL TREATMENT OF CHOREA.

BY

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THE latest articles and studies on chorea that have appeared in the current medical journals do not, in any way, refer to a most important factor in the treatment of this disease.

In the light of an extended experience in the management of chorea, this general omission seems very singular, and I have determined again at this time to refer to the results of my study of this peculiar nervous affection. I say again, for in a paper read before the Medical and Chirurgical Faculty of Maryland in 1878, and printed in the Transactions of that year, I suggested a treatment for chorea which, though it had been proposed before, had made little or no impression on the profession, and, it must be added, the effort seems to have passed unnoticed, or has been entirely forgotten, for the treatment does not prove to have invited either praise or opposition, no place being given to it in the many suggestions made since then, in the journals, for the treatment and cure of St. Vitus' dance. Within the past year chorea has been remarkably prevalent in Baltimore, and though I will not go so far as to say it has been epidemic, or could be so, still I am astonished at the number of cases brought to my notice. In private and dispensary practice I have seen not less than eighty-six (86) cases of this disease during the last year, and both in abridging the duration of an attack, and mak-

ing the cure more permanent, my success has been so encouraging that I am led to believe that this effort should be made to introduce a valuable method of treatment into general notice.

Most of these cases were of a well-marked and severe type, and many of them had proved obstinate under other medical treatment, and while the long list of remedies usually used in chorea had been uselessly exhausted, the patients remained as hopelessly jerky and restless as they were when they commenced to test the whole gamut of a therapeutic treatment. It must not be inferred from this assertion that the plan to be suggested is efficient without the use of drugs, or will be recommended as curative without their aid. This is far from the purpose of this article, the chief aim of which is to call attention to the fact that chorea cannot be treated by drugs alone, and that the best results can only be obtained by a combination of medical regimen and proper physical care. But this last element requires much careful attention on the part of the physician, and much tedious monotony on the part of those who nurse the patient, and hence the prospect of popularity for this recommendation is dim and uncertain. Yet it nevertheless deserves serious consideration, for in my hands it has proved in many obstinate cases the best and most reliable means of bringing about recovery.

To select an example of the information which can be obtained from various authors in regard to the treatment of St. Vitus' dance, I will refer to Reynolds' System of Medicine. I find the chapter on chorea is full and interesting. It contains a graphic description of the disease, diagnosis, and pathology. In regard to treatment it contains the usual long list of remedies of more or less value, devotes much space to advocating the beneficial effects of exercise and regulated movements, and even goes so far as to recommend dancing. A single paragraph of a few

lines refers to the fact that in bad cases the "recumbent position" is a necessary part of treatment.

Now, this is in my experience the most important factor in the management of all cases of chorea. In the article just referred to, Dr. Radcliffe dwells at length upon the fact that exercise, gymnastics, and regulated movements are most beneficial in this disease, while on the other hand, my success in the rest treatment leads me to be equally positive in my belief that the most rational, efficient, and proper treatment for all cases of chorea is rest. It will be hard to reconcile views so utterly at variance with each other, and I feel tempted to strengthen my opinion with some corroborative testimony. In a report of the service at the Evelina Hospital (*Lancet*, February 10th, 1883), Dr. Goodhart relates a case of chorea major which was treated alone by rest and massage, and though he questions the cure by an interrogation, I look upon the success as an evidence of my theory. The following is an abstract of the report: E. L., girl, twelve years. Admitted September 19th. Seven weeks ago it was noticed that her arms were constantly twitching and she was unable to be quiet. Was seen by two medical men, but in spite of treatment grew rapidly worse. Patient was so bad when admitted that the sides of the bed were padded in order to keep her from injury. Was ordered to bed and to be kept as quiet as possible; only one attendant was allowed to be with her. Full diet and massage for twenty minutes twice daily. October 7th; had improved much. October 14th; could talk better and feed herself. October 26th; was well enough to be discharged.

In some remarks on this case, Dr. G. says: "Thirty-four days after admission patient was quite well. May this be said to be due to massage, to rest in bed, or to isolation from friends and relatives, or to all three combined? She never had any medicine." Personally, this question

is, I think, very easily answered by my own experience of the past year with the rest treatment, and I select from my note-book several cases which will indicate the value of rest and massage as curative agents in this special class of nervous disease.

E. W., age fourteen, well developed, no rheumatic history. Had been under medical treatment for nine weeks when I first saw her. Had been advised to go out as much as possible, to take violent exercise, etc., etc. Worse now than at any time during sickness. After walking, or any exercise or excitement, is always more restless. Persistent insomnia. Saw this patient on December 28th, 1883. Ordered her at once to bed, to be kept as quiet as possible, and free from all excitement, to see no strangers, and to have only one person in room with her. Massage three times daily, and whenever very restless; diet liberal.

December 30th. Decided improvement; restlessness much reduced, talks more distinctly; same treatment continued with addition of tonic before eating. Sol. Fowleri, gtt. xv., and Succi conii ʒ iij. daily.

January 4th. Much improved; sleeps well and appetite very good.

January 14th. Patient is now allowed to sit up for a few hours daily, and on January 21st is allowed to take a short walk and pronounced cured.

H. G., boy, eleven years, was brought to office February 1st, with well-marked case of chorea. Has been under treatment for six weeks. The doctor ordered him to be out in the air all day, to walk far and play hard. The boy himself objected, but this was not allowed, and his mother forced him out each day. Under this treatment he has been gradually getting worse. Ordered patient to bed immediately on return home. To be kept free from all excitement, no children to be allowed in the room, slow and gentle massage three times daily. Treatment same as

last case, with addition of ʒ ss. Sp. frumenti each P.M. In three days the improvement was marked, and on February 9th was almost free from facial grimaces; can talk much better, and muscles of arm and leg are quieter in every way. Patient does not object to bed, feels so much more comfortable that he is willing to stay in one room a month if it is necessary.

February 25th. Report good, and so much improved that he is allowed to sit up, and on 28th goes out, cured.

N. H., girl, thirteen. Had been quite sick with intermittent fever, and during convalescence was noticed to be irritable and restless. In ten days well-marked chorea was developed, and I saw her October 8th, about two weeks after the commencement of attack. Movements of extremities were unceasing, and sleep was much disturbed. Ordered same treatment as in preceding cases, with addition of quiniæ sulph. and substitution tinct. cinchona flav. for ordinary tonic. Massage has very soothing effect upon this patient, and she asks to be manipulated all the time.

October 12th. Has much improved, but on 13th had a chill, after which she became worse. Up to 23d patient had several bad days, clearly owing to the malarial complication; and after this date she steadily improved, and was allowed to go out on November 5th.

These are cases in private practice where any special directions in regard to care and nursing can be faithfully carried out, and in which one would naturally expect better results than in dispensary cases. But although among the poorer classes the element of quiet in conjunction with rest is almost impossible, still I have found this treatment, even when modified by circumstances, to be of great value. Patients that have resisted all forms of treatment finally succumbed to power of rest and massage. Of the fifty-three (53) cases seen at dispensary for nervous diseases during the last year, all of them were placed under this

treatment, and though this number includes many severe cases of chorea major, the success has always been encouraging.

The limits of this article prevent me from giving further details of cases, and I will now come to the discussion of the plan of treatment which has been advocated.

If exercise and regulated movements are found to give the best results on the physical side of the treatment for St. Vitus' dance, we should be loyal to this rule, for the care of the patient is less irksome, and the responsibility in the case is reduced to a minimum.

But, on the other hand, if by experience, if by the encouragement of good results, we find that rest curtails the disease, renders recovery more permanent, and makes the patient much more comfortable during the attack, I think the views so long entertained by the majority of the profession should be modified, if not absolutely changed. Now, it has been my experience that to place a choreic child in the best possible condition, to secure rest and quiet, to insure an avoidance of all external irritation, and to invite sleep whenever that sedative influence can be brought about, is a matter of the utmost importance, and the greatest possible aid to the action of various remedies.

It is impossible to expect sedatives, except in injurious doses, to quiet the constant turmoil of the body which always exists in bad cases of chorea, and which is always increased by exercise or excitement of any kind. For each movement or effort brings on a succession of irregular and exaggerated muscular twitchings, and these so irritate and exhaust the patient, that a state bordering upon frenzy is brought about. The effort to reduce this frenzy to a minimum, and by quiet and absence of excitement to induce repose, is certainly a rational one, and I have often found that those who are in charge of choreic

children agree with me that walking or exercise of any kind invariably makes them worse.

It seems difficult to believe that regulated movements or calisthenics could have been recommended as a means of cure for a disease which clearly demands rest and quiet as the two essential points to be sought for and obtained. In a patient suffering from chorea, any voluntary movement excites and brings on a series of exaggerated motions, both in the muscles directly concerned in the action and in other parts of the body. Thus, forced exercise in such cases must be a species of torture, and the sum of unnecessary and irregular movements amounts to a general condition of clonic spasm which, I am quite sure, must needlessly prolong the duration of the attack. Indeed, I sincerely hope that the semi-homœopathic system of movements curing movements will be now entirely abandoned; for whatever may be our idea of the pathology of chorea, the fact still remains that there exists a certain irritability of the nerve centres which produces the most prominent symptom of the disease. To reduce this irritability is the first indication of a wise treatment, and I cannot see how this is to be accomplished by excitement or violent exercise. Entire freedom from all external distractions and prolonged rest in bed are the best means of reducing this irritability, and these soothing influences make the patient less difficult to manage, and more amenable to treatment.

I have purposely omitted until the end of this article to give in detail the method adopted by me in the management of St. Vitus' dance, for I am anxious to place it before the profession with as much emphasis as possible, and I know that often the last part of an article is read when the rest of it may be neglected. An effort must be made to induce others to give the rest treatment a fair and impartial trial, and I am sure one case treated after

the following method will convert the most ardent champion of the exercise or gymnastic treatment from a grave and cruel error.

As the factor of the first importance in this method of treatment is rest, the patient should be confined to bed in a quiet and moderately-lighted room, and this seclusion must be so guarded that it cannot be disturbed, and so supplemented that it cannot produce weakness.

Massage by slow and gentle gradations will gradually give the patient ample passive exercise, and this should be rigidly carried out at least three times each day. Any momentary excitement can be lulled by these manipulations, and the attendant will soon learn that this is the *best means* of controlling the restlessness which always makes its appearance in the afternoon. When sleep does not come naturally to the patient, some means to produce it will be employed, but not until the slowly repeated massage has been given a fair and thorough trial. This amount of passive exercise will improve the appetite, and thus it will be possible to give nourishment frequently and in ample quantity; and if the manipulations are carried out with care and assiduity, the torpor of the bowels is prevented, and no ill effects can result from a prolonged confinement in bed. It will be found best to have the patient in charge of one attendant, whose duty it will be to prevent all unnecessary conversation, and to protect the patient from all causes of excitement, and who will carry out each detail of the treatment with honesty and precision.

As an aid, therefore, to any medical treatment, this system of rest is invaluable, for it places the patient in the best possible condition to be affected by drugs, and being as quiet as the circumstances will allow, the element of habit, which is by no means to be forgotten, is rendered every day less powerful.

A CASE OF SPINAL HEMIANÆSTHESIA AND HEMIPARAPLEGIA AFTER FRACTURE OF THE DORSAL VERTEBRA.

BY

THOMAS M. TAYLOR, M.D.

THIS case is recorded because it was by a study of similar symptoms which had been produced experimentally, and which were afterwards discovered clinically, that Professor Brown-Séquard succeeded in establishing many anatomical and physiological facts, and as he has by no means exhausted this special field, this will be of interest to those who follow him.

The patient, a German, aged twenty-two years, came first under treatment at the New York Polyclinic, neurological department, July 6th, 1883, when the notes given below were taken.

He is well nourished and apparently healthy. With the assistance of a cane he walks very awkwardly, like a hemiplegic with descending degeneration in the left half of the cord. The left lower extremity is stiff, as well as paretic, and with eyes closed he stands rather unsteadily. On removing the clothing, a well-defined kyphos is found in the spine, with its apex about the third dorsal vertebra. The head and neck, drooping forward from this point, give him a stooped appearance. Decided tenderness on pressure is limited to the region of this deformity. Movements of the upper spine in any direction, especially extension, and concussion in its long axis, produce pain which is invariably referred to the same part of the column. An

angular deformity in the middle third of the left clavicle is evidence of previous fracture in this situation, with much overlapping of the fragments. Head, neck, and upper extremities seem normal as to power, sensibility, and nutrition. Vision, respiration, and deglutition are uninterfered with.

On the left, side patellar tendon-reflex is greatly exaggerated, and ankle clonus present. On the right, while the knee-jerk is more than normal, the ankle phenomenon cannot be obtained. Cremaster reflex is absent on the left.

Power is very perceptibly below normal in the left limb, but just how much it is diminished it is difficult to say, owing to the great rigidity which pervades the extremity. No atrophy nor diminution of temperature as tested by the hand is noted in any part. A slight degree of vasomotor paresis may be present on the left side. Muscular sense is tested, but no satisfactory knowledge obtained on account of the patient's obtuseness. If impairment of this sense, however, be present, it cannot be marked. On the left side, below the level of the injury, sensibility to tactile, thermal, or painful impressions is at least as good as in other regions of the body, and to the last-mentioned variety it is abnormally acute; while on the right, or non-paretic side, from the middle of the scapula behind and the nipple in front down to the sole, there is marked but not absolute analgesia. Perception of heat and cold is entirely absent over the same area; while tactile sensibility is quite equal to the opposite side or regions above the injury. Mild irritation, such as might be produced with the end of a pencil or the finger tickles the sole of the right foot; but on the left no sensation, except presence of the instrument is appreciated before pain is perceived. In other words, the left sole cannot be tickled. All temperatures are appreciated as "hot" by the patient on the right

side. In a narrow band stretching across the left scapula, from the median line a few inches below the deformity to the axilla, there is also diminution of thermal, and to a slight degree, of painful sensibility. Repeated attempts to discover a belt of complete anæsthesia with hyperæsthetic superior border, as is depicted in writings upon this form of paralysis,[1] are unsuccessful, though the band just mentioned may be interpreted as an example of the bilateral exposition of the sensory disturbances.

There is no delay in the conduction of impressions. Electrical responses are equal and normal on the two sides, and bladder reflex is also normal. To more easily compare the effect of the central lesion upon the two sides, the symptoms appearing in each may be thus arranged:

Right Half of Body below Level of Deformity.	*Left Half of Body below Level of Deformity.*
1. Power, probably normal.	1. Power, much below normal.
2. Atrophy, none.	2. Atrophy, none.
3. Vaso-motor paresis, none.	3. Vaso-motor paresis, slight.
4. Electrical response, normal.	4. Electrical response, normal.
5. Muscular rigidity, none.	5. Muscular rigidity, marked.
6. Reflexes: (*a*) patellar tendon, slightly increased.	6. Reflexes: (*a*) patellar tendon, greatly exaggerated.
b. Ankle clonus, absent.	*b*. Ankle clonus, well marked.
c. Cremaster, present.	*c*. Cremaster, lost.
d. Plantar, normal.	*d*. Plantar, diminished.
7. Temperature, unchanged.	7. Temperature, unchanged.
8. Sensibility (*a*) to touch, normal; (*b*) to tickling, present and well marked in sole of foot; (*c*) to thermal changes, absent; (*d*) to pain, greatly diminished.	8. Sensibility (*a*) to touch, normal; (*b*) to tickling, none in sole of foot; (*c*) to thermal changes, except over scapula, normal; (*d*) to pain, increased, except as in *c*.
9. Muscular sense, normal.	9. Muscular sense, normal.

The account of the accident and its sequel, given by the patient, is briefly this: On the 6th of May last, he fell from the third floor through an elevator shaft, striking the left side of head and shoulder. Consciousness returning

[1] Vide "Diseases of the Spinal Cord," by Bramwell, p. 64; or Ross on "Diseases of the Nervous System," vol. ii., p. 363.

after several hours, he suffered from distressing dyspnœa, with much pain in back and chest, both being greatly aggravated by movement. The dorsal decubitus, with head well elevated, was the one assumed as most comfortable. Urine was never drawn, but the bladder responded slowly for the first five days.

The most interesting feature, however, was complete loss of power and sensibility in the left lower limb, while he was able to move the right freely, and it felt natural to him when handled. There was no girdle sensation, and arms, shoulders, head, and neck were not implicated in the nervous disability.

At the end of two weeks, the dyspnœa was of very little moment, but pain still persisted in the upper part of the spine. He also began to appreciate some impairment of sensibility, especially to heat and cold, on the right side, the left limb having meanwhile improved.

During the fourth week, the left leg began to "shake" at times (reflex movements), and soon after this he was able to feel objects brought in contact with this limb. One week later, he could stand and walk a little, after which improvement steadily progressed.

Treatment consisted in the frequent use of the actual cautery to the spine, more freely over the painful region, and the application of a steel spinal brace.

August 30th, 1883. The treatment has been attended with such success that for the past two weeks the patient has been steadily working at his trade, that of a tinsmith. After wearing the brace about two weeks, and having three applications of the cautery, pain was seldom appreciated, except on unusual movements, and power of locomotion so improved that the further use of his cane was found unnecessary. At this time his spine seems quite firm. Its functions are almost perfect, scarcely any pain remaining even on extreme extension. He walks with ease,

unsupported, but the left limb is still unwieldy, and its sole scrapes the floor as he steps.

November 12th, 1883. There is now only the slightest halt in his gait indicative of weakness in left limb. A certain amount of left lateral curvature of the spine has taken place below the site of the fracture, and the brace has been modified with a view to arresting this. Sensory paralysis and reflexes remain as first noted.

February 1st, 1884. Examination to-day shows the spinal deformity much unchanged, the head and neck carried more erect, and the lateral deviation so slight as to be of no consequence. His gait is almost faultless. Tendon-reflexes have changed very little since the first observation. They are still greatly exaggerated on the left, both at knee and ankle; on the right only at the knee. Power in left limb is not quite normal, but the rigidity has disappeared entirely.

Comparative measurement discovers less than one-half inch atrophy of left thigh, but considerable atrophy of the left gluteal region is apparent.

Electrical responses are similar on the two sides, except that when the pole is applied directly to the muscles of left leg, a little stronger faradic current is required than on the right.

The area of sensory impairment on the right side is somewhat reduced at the upper border, the limit now being at the level of the tenth dorsal vertebra and the umbilicus. The improvement below this line has been chiefly in the variety relating to temperature. For example, he can now appreciate marked differences anywhere above the lower third of this thigh with considerable exactness. An iron that has lain in a room with the ordinary temperature (about 70° F.), if applied is thought by the patient to be "warm;" on first examination, "hot" was the word he invariably used. But if allowed to com-

pare this with one slightly heated, he can always call them correctly. Below the right knee, no improvement seems to have occurred.

To painful impressions recovery is very slow. In no part below the line already indicated is it by any means perfect, and only a feeble effort toward the restoration of this function can be observed since the first note.

On the left side, over a small portion of the scapula, there still exists the same analgesia, but the ability to appreciate thermal changes has been re-established here.

Tickling is now normally acute on the soles of both feet. Hyperæsthesia still prevails on the left side. Temperature on this side decidedly lower than the right. Muscular sense remains unimpaired.

It will be seen that this case accords with the rarer form of the paralysis described by Prof. Brown-Séquard, wherein a part of the sensory fibres in the cord entirely escapes the *foyer* of inflammation, and those pertaining to the other varieties of sensibility are involved in different degrees. Though it is unusual to find a patient who from the first retains the power of appreciating one set of impressions, while to another he is anæsthetic, still it is not uncommon to have this interesting condition exhibited at some time during the process of recovery. In either instance, the explanation enunciated by the experimenter, whose name I have just used, must be accepted, viz., that fibres conducting each variety of sensibility have separate and distinct courses in the cord.

No attempt at the relative location of these tracts has as yet met with full credence at the hands of physiologists. However, evidence is from time to time accumulating to indicate that fibres carrying thermal and painful impressions cross to the opposite side immediately after entering the cord, and those for touch and tickling linger

for a time before decussation, while muscular sense ascends on the same side as the motor impulses descend.

The frequent limitation of the paralysis to painful and thermal impressions, other varieties remaining unimpaired, would lead to the inference that their tracts are very nearly associated in the cord. For cases illustrative of this point, beside the present, see *London Lancet* for 1865, Vol. II., p. 116; "Diseases of the Nervous System," by Rosenthal, pp. 267-8; Köbner's *Spinale Hemiplegie; Deutsch. Archiv für Klin. Med.*, Vol. XIX., p. 179, Case IV., and others.

A point with reference to the course of these fibres across the cord to their proper tracts in the opposite half is presented by this case.

Finding it nowhere alluded to, I think it not unworthy of note here. It will be remembered that my patient had loss of the same varieties of sensibility in a small area over the left scapula as prevailed so extensively on the right half of his trunk and lower limb, and to about the same degree, and that improvement here went *pari passu* with that on the opposite side. From this it may be inferred that the two sides are affected by a single lesion situated in one lateral half of the cord. To accomplish this, it is necessary that the affected fibres mingle at this point. Therefore, on entering the cord, these, in their course to the opposite half, must pass through the tract of similar fibres on the side first entered.

CASE OF NODULAR TUMOR OF THE CORPUS CALLOSUM.

BY

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THE following case is of interest, not because it is possible to establish any special relation between the symptoms recorded during the life of the patient, and the lesion found after his death, but because of the rarity of neoplasms in the situation in which the one with which I am about to deal was discovered. I have been unable, in the course of a faithful search, to find any accurately described instance of a tumor in precisely the same situation.

As a portion of the history of the patient was obtained from a hospital record, I will, in order to avoid repetition, omit those details from my private notes which are reported in the former.

Walter A——, house painter, aged thirty-one, contracted an indurated chancre on the penis in the spring of the year 1873, which was followed by secondary symptoms of the ordinary type. He underwent treatment at the hands of several well-known specialists, going through the many and varied forms of therapeutics which, as the patient was addicted to an irregular mode of living, met with but indifferent success, although the active features of his disease were considerably modified. Still he remained in an impaired condition of health until the year 1880, when he experienced a severe attack of what was supposed to be meningitis, from which he rallied only after a long and tedious convalescence. Under careful treatment and restricted habits, his general condition so improved as to enable him to superintend his business, which was of considerable extent, and to serve a term in the State Legislature. He remained quite free from any mani-

festation of his constitutional trouble to a period in the fall of 1882, when he first came under my observation for an attack of bronchial hæmorrhage and an affection of the right wrist-joint, involving the various structures of the same generally. Under cod-liver oil with tonics his pulmonary symptoms subsided, but specific treatment in reference to his articular trouble yielded negative results. Annoyed by his want of success and acting under advice of his friends, he repaired to the Hot Sulphur Springs, where, during a sojourn of six months, his health was much improved. On his return home by way of St. Paul, he was seized in the latter city with an attack of left facial paralysis, involving the soft palate, and which, according to his statement, came on slowly (ptosis was not present). On his arrival in New York, in the spring of 1883, he exhibited, aside from a slight facial asymmetry, but little evidence of his later lesion; his weight, appetite, and general condition being very much better than at any time from the inception of his disease. He now devoted himself to his business, feeling comparatively well, until the middle of summer, when he began to complain of headache, which was principally frontal, and marked by nocturnal exacerbations. Under ordinary treatment this symptom was very much modified; when on one very warm day, while overseeing a large contract on the river front, he was, on his return home, attacked at the dinner-table by a violent convulsion resulting in considerable laceration of the tongue. Thinking possibly that heat and alcohol might have been exciting factors in the causation of the latter, I awaited developments. A noticeable change in his mental condition now began to take place, evident not only to myself, but to his relatives and friends. It manifested itself in moroseness, hebetude, in short that class of symptoms which introduce the dementia characteristic of cerebral lesions of luetic origin. His second convulsion occurred some six weeks later, followed by others of lesser severity. As his habits were not of the best, and in view of his general deterioration, hospital seclusion was suggested, and in the following October he was received in Presbyterian Hospital under the service of Dr. Freeman. Prior to his admission, a very careful ophthalmoscopic examination was made by a member of the visiting staff, with negative results, not the slightest circulatory or nerve change being present. Although the evidences of a gummatous growth of central character were not present in some of their features, still this view was entertained to the exclusion of a diffuse arteritis or disease of the membranes.

Through the courtesy of Dr. McBride, the following history was obtained from the house physician, Dr. Charles G. Wagner.

Walter A——, age thirty, born in New York City, single; white; painter. Admitted September 25th, 1883.

Patient states that parents are dead. Father died at forty-eight (of apoplexy). Mother died at fifty-two of tumor (supposed cancer). Patient's health was good until eight years ago, at which time he had a chancre. About two weeks before admission patient had three convulsions about three days apart. He says he suddenly lost consciousness and fell to the ground, and remained unconscious for about one-half hour, after which he rapidly recovered and soon went about his ordinary business.

Last January (1883), he had l. facial paralysis.

He has had sore throat, falling out of the hair, and supposed syphilitic rheumatism. He has been a beer drinker. Has had gonorrhœa and its complications.

Many years ago, he was run over by a street car and injured about the head.

On admission. General condition, very good; patient complains of mental hebetude; pulse, respiration, and temperature normal.

Angle of mouth depressed and drawn to the left; tongue when protruded deflects to the left.

Superficial and deep reflexes all appear somewhat increased. Heart and lungs normal; examination of urine gave negative results.

Patient was put on the iodide treatment and remained but a short time, when feeling somewhat improved, he left the Hospital.

During a brief stay of five weeks, in which time he had not the slightest convulsion, with a corresponding improvement in a general way, he began to tire of hospital restraint, and sought his discharge after the period above mentioned. Although kept under treatment, his favorable condition was of but short duration, his headache returned with increased violence, and he now began to suffer from attacks, characterized by suddeness of onset, great weakness in the lower extremities, nausea, pallor, without loss of consciousness, and sometimes accompanied by profuse sweating, with renewed severity of headache. These occurred as frequently as once a day, leaving him in a very prostrate state physically and depressing him equally so mentally. His condition was now such as to confine him to his room, palliative treatment only be-

ing directed, when on one day, on his retirement to the closet on the same floor, and his absence being somewhat prolonged, he was found in a comatose state, evidently from a convulsion from which he died several hours later, on November 5th, 1883.

I fortunately secured an autopsy, which I performed the following afternoon with the assistance of Dr. Nathan E. Brill, in the presence of Dr. E. C. Spitzka, under whose direction the subsequent minute analysis of the case was made. The cranium was opened according to the method usually followed by the last-named pathologist,[1] that is, the line of division of the skull ran transversely from the foramen magnum to the vertex. I am particular in mentioning this circumstance, as it explains an episode of the autopsy. The opening in the occipital region had been made very small, and one of us, in endeavoring to loosen the arachnoid attachments in the great median fissure, feeling an irregular mass in the median line, asserted that the previous operator had lacerated the brain. The latter repeated the examination, and from the unusual consistency of this mass, and the continuity of the structures ordinarily found in the neighborhood, was enabled to declare the physical nature and location of what inspection later confirmed to be a tumor, before the brain was removed from the skull or the region where the tumor was situated became visible. (Figure 1.) The removal of the brain and upper part of the spinal cord was effected without difficulty. The following is the record of the recent appearances:

No anomaly of the scalp; several cicatrices in the forehead;

[1] The advantages of this method were strikingly illustrated in this instance. The autopsy was performed in a small bed-room, nearly filled by a bed, and there was no opportunity of making the examination except by leaving the corpse in the coffin. The body being raised, a single incision was made. The ordinary method would have required the removal of the body from the coffin, or, at least, the possibility of working on both sides of the latter, neither of which requirements could be complied with, owing to the confined space and the lack of dead-house conveniences.

calvarium eburnated, the diploë being undemonstrable and the entire thickness of the cranium, which was somewhat over the normal, was of ivory consistence, presenting much resistance to the saw. Inner surface of calvarium normal. Slight defect of outer table at glabella. Dura normal, excepting a slight thinning at the convexity of the parietal region. Opacities of the arachnoid, noticeably prominent, over the præcuneus in both hemispheres. Pacchionian bodies numerous. Gyri normal in disposition and arrangement, somewhat flattened on the convexity of the frontal lobe. Considerable venous injection of the pia.

On separating the hemispheres, or rather on allowing the frontal lobes to separate, after removal of most of the membranous investments, the mass which, as above related, had been suspected to be a nodular tumor on the strength of a tactile exploration before the removal of the brain, became visible. It was a firm, irregular body seated on the anterior edge of the corpus callosum, and covering about two and one-half centimetres of its upper face, also encroaching slightly on the curve towards the *rostrum*. Its total length was three and one-half centimetres, its greatest diameter two centimetres. It can be best described as consisting of a main mass, firmly adherent to and apparently continuous with the tissue of the corpus callosum, with several buds sprouting from it before, above, and behind. The disposition of these secondary masses and their mutual relation can be best studied in the accompanying figures.

While the tissue of the corpus callosum was of normal consistency, that of the inner face of the cerebral hemispheres had suffered considerably. The main mass had, as it were, excavated a place for itself at the expense of the fornicate *gyrus* on both hemispheres, so that the entire width of a small segment of this gyrus was destroyed, as far as the cortex was concerned, on the left side, and over half of a similar segment on the right side. In addition, the most anterior of the nodules had excavated for itself a slight depression in the cortex bordering on the junction of the ascending and horizontal parts of the right *sulcus callosomarginalis*. The tissue destruction was greatest in the left hemisphere, as indicated in Figure 2. Here the white substance was destroyed to the depth of a centimetre. The tissue bordering on the excavated regions was firm and of normal appearance and structure, with the exception of a delicate film of an almost glairy material of a reddish tint, and which, on microscopic examination, was found to consist of detritus and numerous apparently free nuclear bodies.

PLATE I

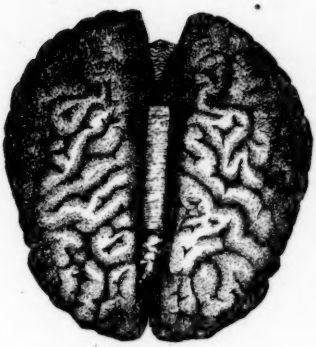

FIG. 1.

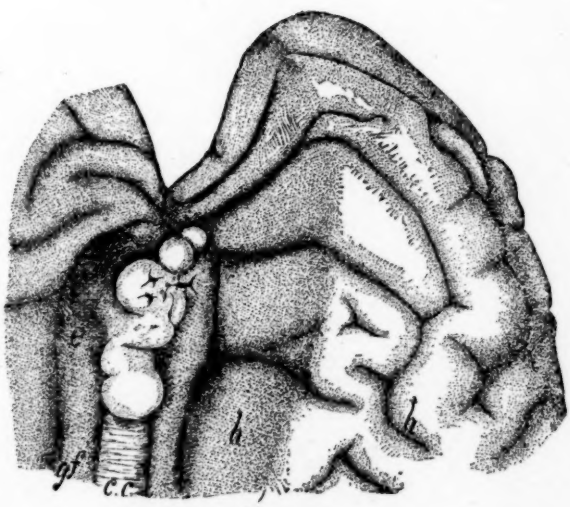

FIG. 2.

The tumor was not submitted to a thorough dissection, in order to preserve the continuity of the valuable and rare specimen. One of the nodules, however, which was spherical and attached by a mere pedicle to the parent mass, was examined microscopically, and found to present the ordinary texture of a cerebral syphiloma with preponderating fibrous elements, most advanced in definite organization at the centre of the growth, while young cells were more numerous in the periphery.[1]

In the present state of our knowledge, it is not possible to refer any focal symptom exhibited by the patient to the neoplasm just described. The most fixed special symptom which would induce one to search for a limited focus of disease as its cause—the facial monoplegia—can certainly not be brought into any relation with it. As certain appearances of the axial part of the brain (whose complete microscopic examination is a matter for future reporting) suggest the possible localization of this cause here, I may be permitted to supplement this, with a brief description of them.

The ependyma of the fourth ventricle is hypertrophied ; there are distinct warty granulations on the cerebellar *fastigium* 1. On the middle and posterior thirds of the floor of the fourth ventricle, there are no individual excrescences. Instead, the natural eminences and depressions are obliterated by an even, firm, new-formation, a slightly lesser degree of a change demonstrated by Spitzka in the same region of the brain in the case of a patient manifesting extreme syphilitic changes, whose autopsy I assisted in last summer. Just as the surface irregularities of a country are concealed by a deep fall of snow, so the *alæ* and *striæ medullares acusticæ* were obliterated by the hypertrophied ependyma in patient A——. In this new formation, there were irregularly scattered pittings.

[1] As it is my object merely to report in this communication what is of special interest in the case, I have waived giving a minute histological description, particularly as the analysis of the tumor will be given in detail, in a further contribution, to be based on researches now being conducted in the same laboratory where this examination was made.

The *velum medullare* on the right side was firmly glued down to the floor of the ventricle up to the right *eminentia facialis*, without covering it (?). The fusion was so intimate, through the medium of the ependymal proliferation, that, while the line of natural separation could be identified, separation itself was impossible.[1]

I have not hesitated to report this case, prior to the completion of the microscopic examination, because, on the one hand, I believe that the tumor is to be regarded as a thing by itself, and disconnected from those symptoms which may possibly find an explanation through the further analysis of the, thus far, not minutely examined part of the brain; and, on the other, it gains additional interest from the coincident publication of the topographically similar case of Dr. T. A. McBride.

[1] In the medulla of another syphilitic subject, preserved in the same laboratory, the left division of the *plexus choroideus ventriculi quarti* was inseparably adherent to the medullary and cerebellar surfaces adjoining, with its normally free surface.

A CASE WITH TUMOR IN THE OPTIC THALMUS.

BY

T. A. McBRIDE, M.D.,

Visiting Physician Presbyterian Hospital.

A. S. L., aged forty-eight, admitted to hospital Jan. 4th, 1883. Family history good. Has enjoyed fair health up to within last two or three years. During this period has complained more or less of headache, which within the last few months has been quite severe. Likewise has observed that he could not walk as well or dress himself—button his clothes—as well as formerly. States, however, that he has not recognized one side weaker than the other. Has been "harder of hearing" of late and has had some difficulty in micturition. His statements are confused; memory poor. It is with the greatest difficulty that any history is obtained. Patient is anæmic, emaciated, has pityriasis tubescentium, and ecthyma cachectica present on his legs; is obtuse and apparently deaf, but this cannot be determined by reason of his mental condition; is incoherent and wanders.

He lies in bed upon his back; has cerebral paralysis of left face; left arm and leg are extended; right arm and leg flexed. Left arm and leg, when raised and let fall, do so as dead weights. The right extremities, when raised and the lifting power removed, come down under the control of the will. No anæsthesia or hyperæsthesia could be made out in the patient's condition. Tongue deviates to the left side.

Left patellar tendon reflex exaggerated; plantar, cremasteric, abdominal, and epigastric reflexes same on both sides.

Abdomen not retracted and no *tache cérébrale*. Percussion of the cranium occasions no pain except over the left mastoid process. Patient complains of diffuse spontaneous pain over left occipital region.

Ophthalmoscopic examination not made, for the reason that no instrument was at hand. Urine acid, no albumen, spec. grav. 1.020; urates; microscopically only urates.

No cardiac disease; peripheral arteries thickened and tortuous.

Patient strenuously denied ever having had syphilis or any syphilitic manifestation. The patient had no febrile movement from date of admission until January 8th, 3 P.M., when the temperature was 102.8° F.

January 9th, temperature P.M. 103.5°. Patient mildly delirious.

January 10th, patient delirious. Pulse 120, temperature 109° F.; no change otherwise.

January 11th, patient delirious, but more stupid. Pulse 120, temperature 104° F. No change otherwise.

January 12th, patient more stupid, becoming comatose later in the day, with stertorous respiration. Pupils have been dilated for ophthalmoscopic examination. Plantar, cremasteric, and epigastric reflexes absent on both sides. Patient died at 9 P.M.

Autopsy, nineteen hours after death.

Examinations of the *fundi oculorum* reveal no changes.

The kidneys presented the changes of chronic diffuse nephritis (no evidences of this change were apparent the short time he was in the hospital, although suspected).

The dura was firmly adherent to the skull and convexity of the hemispheres. There were no emboli or thrombi in the middle cerebral arteries. When the two hemispheres were separated, a hard tumor was found within the right hemisphere; size about that of an English walnut. It protruded outward into the longitudinal sulcus and inward into the ventricular cavity, and with reference to the exterior of the brain was directly under the fissure of Rolando. It had its origin in the right optic thalamus at the junction of the posterior and middle thirds. Both lateral ventricles contained considerable fluid.

Dr. T. E. Satterthwaite, the pathologist of the hospital, and Dr. W. H. Porter, the curator, consider the tumor to be a gumma.

The patient had no convulsions in the hospital, but friends of the deceased, on coming to the hospital after his death to remove the body, stated that he had two convulsions, one two months before entering the hospital, and a second followed by left hemiplegia a day or two before being received into the hospital.

The chief interest in this case centres in the location of the tumor. The accompanying illustrations exhibit its relations as well as the condition of the specimen submitted to the draughtsman permitted.

The first diagram shows the relations of the tumor in an

PLATE II.

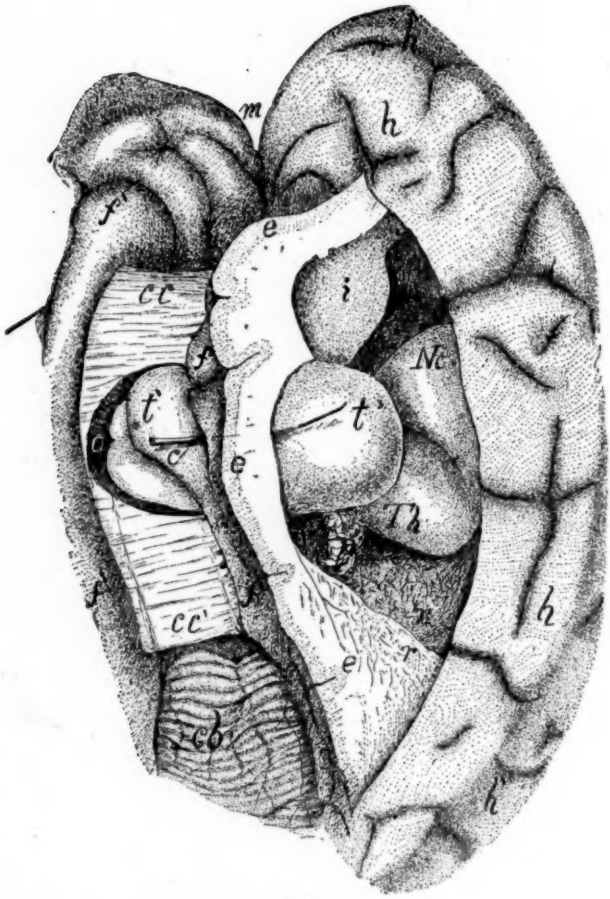

FIG. 2.

ideal transverse section of the hemispheres through the thalamus. *Th*, thalamus; *v*, lateral ventricles; *c*, caudate nucleus; *Cr.*, crus; *L*, lenticular nucleus; *K*, internal capsule; *cc*, corpus callosum; 3, third ventricle. The dark shaded area is that of the tumor.

The plate exhibits the internal face of both hemisphere, represented as separated, so as to put the corpus callosum on the stretch, thus exposing the extraventricular portion of the tumor; the mesal wall of the right hemisphere is incised longitudinally, the part above the incision (*h h*), being raised and moved laterally so as to expose the interior of the ventricle, with the intraventricular part of the tumor. At *c* a bristle has been passed through the open-

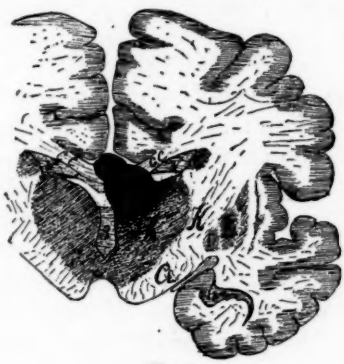

Fig. 1.

ing between the internal edge of the gyrus fornicatus and the tumor, thus indicating the communication of the extraventricular and intraventricular portions of the latter; *cc*, *cc'*, anterior and posterior ends of the corpus callosum; *f*, left gyrus fornicatus; *ff*, right do.; *cb*, cerebellum; *e*, *e e*, cut mesal wall of hemispheres; *i*, inner wall of anterior ventricular cornu, bulged inwards by the strain of the separation alluded to; *rr*, broken portions of cerebral tissue; *Th*, thalamus opticus; *Nc*, nucleus caudatus; *p*, choroid plexus; *t*, intraventricular part of tumor; *t'*, extraventricular part of same; *a*, absorption gap in corpus callosum.

SOCIETY PROCEEDINGS.

PROCEEDINGS OF THE PHILADELPHIA NEUROLOGICAL SOCIETY.[1]

THE first stated meeting was held Monday evening, February 25th, 1884, the Vice-President, Dr. Charles K. Mills, in the Chair. DR. MILLS read a paper on

THE M'GINNIS CASE.

A history of the case, including an account of the crime, and a discussion of the formation, proceedings and reports of the commission to inquire into the mental state of McGinnis was given.

The facts indicating the insanity of McGinnis were summarized by Dr. Mills, in the course of his paper, as follows: A bad family history; evidences of the monomaniacal character, as shown by a study of his life and present condition; the existence of a delusional state, and even of special delusions of a depressive and persecutory type; the presence of hallucinations of hearing and sight, the former being connected largely with persecutive ideas; some manifestations of religious monomania; a history of alcoholism, and the fact that his chief delusion, that of marital infidelity, was one often found in chronic alcoholic insanity.

The next paper was entitled :—

CASE OF UNILATERAL SPASM, HEMIPLEGIA AND APHASIA, FOLLOWING MEASLES IN A CHILD TWO YEARS AND FOUR MONTHS OLD.

BY LAMBERT OTT, M.D.,

Assistant in the Nervous Department of the Post Graduate Course of the Jefferson Medical College.

Boy, aged two years and four months, healthy and intelligent, talked well for one of his years. April 2d, he had a mild attack

[1] Official report.

of mumps. Seven days later he was seized with premonitory symptoms which ushered in a well-defined attack of measles. Other children in the same house were just convalescing from this exanthema. No physician was called, and nothing more was done than keeping him warm in bed and administering an occasional purgative. On the tenth day after the beginning of the disease, the mother states that he felt well, was laughing and playing in bed, but instead of the dull yellowish stains which remain after the papules of measles have faded, his skin was dotted with spots of a purplish hue. The same morning the mother noticed a twitching of the musles of the right eye and right side of face, and soon after similar movements of the right arm and leg. He remained conscious during the spasm, but was unable to speak, motioning for anything he wanted. After the spasm had existed an hour, the leg ceased to move, and was found to be paralyzed. Half an hour later the arm-jerk stopped, and the limb lay powerless by its side; the face movements continued only a few minutes after the arm became quiet, when the side of face was observed to be paralyzed. While the right-sided convulsive seizure was going on, the left arm and leg were affected with choreic movements, which subsided soon after right-sided paralysis was manifest. Two hours after the first appearance of the spasm, I noted the following condition: Ptosis of right eye; no change in pupils, and no disturbance in movements of eye-balls. When he cried the right side of the forehead remained smooth, while the left was markedly corrugated; no paralysis of tongue, but complete *aphasia*. I was unable to investigate the special senses on account of the age of the child. Motion in the right arm and leg was completely paralyzed, sensation partially. He was conscious and drank water with very little difficulty. The left side of the body showed no disturbance of sensation or motion, excepting occasional choreic twitching. The dread the child had of strangers prevented me from examining the heart. Temperature, 101; pulse, 120; respiration, 20; and very irregular. Some bronchial catarrh.

Second day. Temperature, 102; pulse, 130; respiration, 40. Had no vomiting; intelligence remained good; tongue dry; passed water and fæces involuntarily. During the next six days his fever remained high, cough increased, and evidences of catarrhal pneumonia developed.

About the ninth day the mother called my attention to a bulging of the right side of the chest, resembling the deformity produced by a large pleuritic effusion, with a marked lateral curvature

of the spine, the convexity being toward the right side; percussion of the lung of this side elicited hyper-resonance, and auscultation, normal breathing with prolonged expiration. The chest deformity was apparently due to contraction of the muscles of the left side. He had conjunctivitis of right eye and dribbling of saliva from the right angle of the mouth. Was very irritable, and often carried his hand to his head and moaned. Urine examined and found normal. The choreic movements of left side returned, but were not as marked as at first.

In the second week the muscles of the face began to regain power.

In the third week there wasno marked change in his condition except a peculiar swelling and tenseness of the paralyzed leg, which persisted four days, and suddenly disappeared during one night; the next morning the leg was very flabby. Electro-muscular contractility was fair. In the latter part of the third week his head was drawn to the paralyzed side, the chin pointing to the left, showing the peculiar influence of the healthy sterno-mastoid, and other neck muscles, which was pointed out to me by Dr. Eskridge. The muscles of the right side of the neck were flabby; those of the left side were hard and tense. Lifting the head would place it erect, but when unsupported, would fall into its former position. In the fourth week movements were noticed in the arm, and in the fifth week the leg began to regain power. He was now, for the first time, using a few monosyllables as ma, pa, etc.

In the fourth month he walked fairly; used a few more words, especially the simpler ones.

In the sixth month of his disease his general health was good, and he was talking more, but only using such familiar words as children learning to speak usually employ. His gait was fair and he was able to run, but there existed a marked weakness of the flexor and extensor muscles of the anterior part of the right leg and of the extensor muscles of the right arm.

I look upon the case as one of embolism of the left middle cerebral artery, obstructing the first branch, called the frontal external and inferior, which supplies the third frontal convolution (convolution of Broca) wherein resides the centre of speech; also the second and third branches, called respectively the anterior parietal of Duret, or the artery of the ascending frontal convolution of Charcot, and the posterior parietal artery, or the artery of the ascending parietal convolution of Charcot. These two latter branches supply the motor centres of the extremities (Ferrier).

The fourth branch, which supplies the angular gyrus, was probably not obstructed, as vision remained apparently unimpaired.

The motor centre of the facial muscles occupies a region in close proximity to those of the extremities, which is also supplied by branches of the middle cerebral artery.

There are some marked peculiarities in the case.

First. The age of the patient, two years and four months. Second. There was no loss of consciousness, which Hamilton says is the exception. In most cases there is either partial or complete loss of consciousness. Third. The disturbance of conformation of the chest, on the ninth day after the spasm. Fourth. The falling of the head to the paralyzed side twenty days after the spasm. Whenever he had a good night's rest, he was able to hold his head erect for two hours; after that time it lay to one side.

The order of recovery of the paralyzed parts was as follows:— First, it is well to recall that the lower extremity lost power first, next the upper extremity, then the face, and later the neck and chest. In order of recovery, the face, neck and chest showed the first signs simultaneously, then the upper extremity, and next the lower extremity. When considerable power had been regained, quite noticeable yet was the weakness of the extensor muscles of the forearm, which gave the hand the peculiar position that resembles the wrist-drop of lead palsy.

Most interesting of all was the occurrence of aphasia. Here was an active little boy, twenty-eight months old, who talked connectedly and as well as usual for one of his age, is suddenly stricken with unilateral spasm, followed by hemiplegia and total loss of the power of speech. His intelligence did not wane one whit during the whole trouble. When thirsty he protruded his tongue against the upper lip. If the parents told him the doctor was coming, he immediately manifested great fear, and beckoned for his mother to come near him.

If he wanted some article in a distant corner of the room, he pointed his finger at it and began to whine. When they put their hands on the wrong article, he intensified his whine, by which they understood it was not what he wanted. As soon as they touched the desired object, a smile came over his countenance.

In the fifth week he spoke his first words, as "pa," "ma," and "no." Later, other simple words were added to his vocabulary. The mother, a woman of experience, having had eight children, made a remark which struck me very forcibly, that it seemed as if he

had to learn to talk over again. At no time did he misapply a word, as calling a "chair" a "table." When once he knew a word and its application, he always used it afterward. At this date (nine months after the attack) his speech is disconnected. If he desires to express a thought, he can make a good beginning. but is unable to finish. For instance; he wants to use the sentence, "Katie, get my hat in the other room!" he can only say "Katie, get my hat————," for the rest of the sentence he uses signs. His being unable to finish a sentence is not that he did not know the word "room," for when used otherwise, he had no trouble in recalling it. When he used three or four words in succession, his speech powers seemed at an end.

The discussion on Dr. Ott's paper was opened by DR. FRANCIS DERCUM, who said he was inclined to regard the interesting case reported by Dr. Ott, as more likely to be one of hemorrhage than of embolism. It is well known that the miliary aneurisms described by Charcot and others, occur sometimes in the very young, therefore, one of the conditions which leads to hemorrhage may be present in infancy. The absence of valvular disease of the heart was also against the idea of embolism.

Dr. Dercum thought that the symptoms presented by the case indicated a lesion of the internal capsule and basal ganglia, rather than of the convolutions. He referred to the more frequent occurrence of hemorrhage in this region, and also of the wide extent of cortex that would have been required to be involved in order to explain the phenomena.

DR. CHARLES K. MILLS agreed with Dr. Dercum that, from the history of the case, the absence of recognized heart lesions, and the age of the patient, the case was probably one of hemorrhage. He believed, however, that some of the facts indicated a cortical lesion. One of these was the existence of choreic movements on the side opposite that which was paralyzed.

According to Duret, when irritative lesions of the cortex occur, they produce not only spasm on the opposite side of the body, but also may cause contraction or spasm on the same side, the result being brought about through irritation of the sensory nerves of the dura mater, which irritation is conveyed to the bulbo-medullary centres.

Dr. Mills referred to the completeness of the paralysis, as a matter of great interest in connection with the views of Broadbent as to the communication by well-worn commissural channels of those parts of the central nervous system which preside over movements of the two sides of the body which are associated.

DR. JAMES HENDRIE LLOYD referred to the remarks which Dr. Ott had made about the angular gyrus not having been involved, and said he was not aware that any well reported cases of embolism affecting the angular gyrus and causing blindness had been published.

DR. DERCUM said that the occurrence of choreic movement on the side of the lesion could be as well explained by the transmission of irritation by means of the commissural channels of the brain, as by the views of Duret.

DR. OTT closed the discussion, and said in favor of embolism is the sudden appearance of the attack, and an array of symptoms which usually follow an embolus in the left middle cerebral artery. In favor of cerebral hemorrhage is the disorganized condition of the blood as a resultant of measles, predisposing to such an occurrence.

On the conclusion of the discussion of Dr. Ott's paper, DR. CHARLES K. MILLS read a

NOTE ON THE USE OF NERVE PRESSURE FOR THE RELIEF OF HYSTERICAL CONTRACTURE.

In three cases Dr. Mills had resorted to strong pressure, applied, by means of the thumb or fingers, to the trunk of the nerve supplying the muscles affected by the spasm in contracture ; in a case of hysterical spasmodic torticollis, and in one of hysterical contracture of the wrist and hand, the condition passed away, and remained relieved ; in a case of long standing contracture at the knees under the effects of pressure in the sciatics the spasm disappeared, but recurred. The procedure was simple, and had value, both as a means of diagnosis and treatment. Whether the effect was produced by mental effect, by causing a temporary paresis, or by the pain, he was not prepared to say.

DR. WHARTON SINKLER spoke of having used the method unsuccessfully in a case of facial spasm, which was not, however, hysterical in character.

A stated meeting of the Society was held Monday evening, March 24th, the President, Dr. S. Weir Mitchell, in the chair. DR. MITCHELL made some introductory remarks, as follows on—

THE OBJECTS AND DUTIES OF A NEUROLOGICAL SOCIETY.

I learned but four days ago that I must meet you to-night, for the first time, as your presiding officer. I thank you for the se-

lection, with feelings which are not altogether made up of pure gratitude.

The time will come, I hope, to all of you, when you will be so weighted with professional cares that the prospect of even an agreeable duty will appear to you as this one does to-night to me. For while it must be a pleasure to preside over a set of thoughtful men, united by the bonds of a common sympathy, the fact that this involves new duties is one from which I cannot escape. I shall begin by saying that this year, especially, I shall be absent often and for long periods from your meetings, and I have so stated before consenting to serve with and for you.

My own view of the duties of a president involves much more than merely to preside at meetings. He may do much by exciting and guiding debate, by arranging to secure papers, and by urging, and, in a measure, influencing, research.

He also has certain duties as a critic, and, as critical duties are most pleasantly fulfilled when there is as yet nothing to criticise, I shall begin mine by saying briefly what I think this Society ought to be, what its individual members should seek to become, and what they ought to avoid being.

This brings up a question as to why medical men organize societies or join them. When there were no journals these meetings had an obvious purpose, in the needful relations they established. They were to knowledge what the old exchanges were as regarded commerce. But now we have every new thing thrust at us in weeklies which we scarce find time to skim. What, then, is the need for societies? Except, as in the case of our College of Physicians, they cannot sustain libraries, or act on public opinion, or nourish pleasant fellowship. If they have a real reason for existence it is in the fact that they bring together in groups men having common interests, so that these men stimulate one another by example and criticism, and by the sympathy arising out of unity of pursuit.

It is never very well to be absolutely isolated in your pursuits. I, myself, can well recall how little interest I found in this city in physiology when I first began to work at it practically. It was a real and serious discouragement. The reverse of this condition of intellectual loneliness has its use. All men do more and better work amidst the competitions of other workers. Some men can do no work, unstirred by the ferment of companionship in like efforts.

In these subtle agencies lie the value of associations like ours—in the examples they offer, the discipline they teach, the criticism

they afford, the sympathy they evolve. The advantage of small societies is that they secure definiteness of aim, and that we hear only what interests all who are present.

The danger of such bodies is that of narrowness, and is the risk to which all persons pursuing specialties are themselves liable. It is to be avoided by not limiting your thoughts to what you discuss in this hall, and by keeping up that sympathetic wide-awakefulness which should preserve for you an interest, and a watchful one, concerning the work done in all other lines of professional progress. Neurologists are least of all liable to fail in this direction; their special study is too broad, and their exposure to this form of degeneration only comparative. It is the small specialties which suffer most, and for that reason I would allow no one to practise otology or ophthalmology alone who had not had ten years of general practice. Nearly every one in such a society as this should be is capable of entering debate with something worth contributing; whilst in large collections of men a few members only debate a subject, and it may chance to have no relation to the active, practical life of the mass of those present. We shall hope, then, to see here enough of debate; unsparing yet courteous criticism, a desire to talk only when there is something to say, and a highly cultivated tendency to sit down when that thing has been said. The habit of repetition, of unthoughtful comment and unfruitful criticism, shall have no place here.

Let me say a word as to papers. No doubt we shall, in our existence as a society, hear some papers which, to use an Irish phrase, would have been more interesting if they had never come into being. As to these future, and, therefore, defenceless, victims of unjust attack, a word in advance. When a man presents an essay here or elsewhere he should remember that, for a time, he has a group of people at his mercy, tied to the stake of patience by the bonds of social courtesies. It is his duty to have something to say, and then to say it as briefly as possible. There is no literary praise one ought to value like that of condensation. When it is not possible to make brief reports as to cases, it is advisable, for society purposes, to cut them short by reasonable omissions.

Single cases, or those with clinical personal illustrations, are more desirable here than in larger societies, but I am apt to think little of the future of young men who are in the habit of reporting single cases. Let us have these only when they possess real value, or are unusual enough to evoke fresh thought and discussion. The patience which selects a subject and for years works at it, waiting for cases, and maturely considering them, seems to be

rare in this country, despite of the sure rewards which await its labor. Let us hope to welcome here many such contributions.

Especially may I hope to see and hear much of therapeutics. In the numberless queries for debate at the International Medical Association at Copenhagen I saw not one therapeutic question, and there is a strong feeling in America that in England and this country therapeutics are more sincerely studied and more constantly kept in view by the best physicians than in Germany and France. This is possibly true, and may be owing to the growth of doubt engendered by the certainties of purely scientific work in regard to the insecurity of therapeutic decisions. It is too true that direct therapeutics often owe little to the great masters in neural research; but it is not always true, and from some of the most scientific the art of healing has gained directly, as well as indirectly, through improvements in diagnosis, much that is of priceless value.

Here we must never cease to remember that our ultimate object is to relieve from pain and disability, and to save from death. Let us, therefore, keep constantly in view this matter of therapeutics. Let us see all new instruments, consider new drugs, receive hints from our laboratories, and perhaps have deliberate debates or conferences given over to some single agent, or to the treatment of some one disease, with the sharpest criticism upon supposed results.

As an example, I would like well to learn whether all of you accept the present views of the value of strychnia and the theory of its action, and to hear your evidence thereon.

Not less would I like such a conference with some surgeons added on the value of ovariotomy as a therapeutic measure in insanity. I mention these as illustrations; but your ideas as to exclusive diets in nervous maladies would be as interesting.

Regarding you as a set of men grouped for a certain kind of work, something more may be said.

You ought to appoint committees now and then to collect material and suggest work, or to deal with certain questions, such as the best means of determining the amount of sensation present in a part. As to this, there are, except Weber's plan, which fails of value save for slight cases, no generally adopted and trustworthy methods. In the same direction there is good work to be done by collective labor in determining, through the effect of nerve sections, the true distribution of nerves to the skin. I might easily multiply such questions; and some of them would have a peculiar value, relative to climate and seasons in America; and of these

would be the relation of rheumatism to chorea, and the statistics of cerebral apoplexy relative to temperature.

It does not seem to me that it will be ever wise to attempt separate publication of proceedings. If there be any surplus of money it may go towards aiding laboratory work, or to completing for our college library its very imperfect collection of books on neural maladies.

With these hints, and with my renewed thanks, I enter with you upon your society life, in the hope that it may be long, vigorous, and interesting.

SPINAL ACCESSORY SPASM.

DR. SINKLER presented a patient suffering from spinal accessory spasm, and read the following history of the case :—

Anna B. K., aged forty-one years, single. Has never enjoyed very good health, but has had no special illness. She has had neuralgic headaches for several years, and about three years ago had rheumatism in the left shoulder. In the spring of 1882 she noticed that, while sitting sewing, her head would turn toward the right shoulder. She could control the movement at first, if she directed her attention to it, but it soon began to be worse, and less under the influence of the will. In June or July, 1882, she became unable to restrain the movements of her head. There was no pain in the neck or head, but she became nervous and irritable. There was a sense of discomfort on the top of her head. The use of her eyes seemed to make the movements more troublesome. Her general health has been fairly good; the appetite poor, and she has worried greatly. She was under Dr. Sinkler's care, at the Infirmary for Nervous Diseases, for several weeks in the spring of 1883, and various remedies were used. Galvanism and static electricity were faithfully applied, as well as message. Hypodermics of atropia were given in the muscle affected, and the bromides and gelsemium were administered. There was no benefit apparent from the treatment.

The patient was re-admitted to the Hospital a few days ago, and her present condition is as follows : She is thin and of spare build. She usually sits resting the right side of the face against her hand, to check the movements. The head is rotated to the right every few seconds, and turns more frequently if she is excited or nervous. The chin is turned strongly to the right and the head inclined slightly in the same direction. The head is not drawn back. After being held in this position for about two seconds, the spasm relaxes and the head becomes straight. She

rare in this country, despite of the sure rewards which await its labor. Let us hope to welcome here many such contributions.

Especially may I hope to see and hear much of therapeutics. In the numberless queries for debate at the International Medical Association at Copenhagen I saw not one therapeutic question, and there is a strong feeling in America that in England and this country therapeutics are more sincerely studied and more constantly kept in view by the best physicians than in Germany and France. This is possibly true, and may be owing to the growth of doubt engendered by the certainties of purely scientific work in regard to the insecurity of therapeutic decisions. It is too true that direct therapeutics often owe little to the great masters in neural research; but it is not always true, and from some of the most scientific the art of healing has gained directly, as well as indirectly, through improvements in diagnosis, much that is of priceless value.

Here we must never cease to remember that our ultimate object is to relieve from pain and disability, and to save from death. Let us, therefore, keep constantly in view this matter of therapeutics. Let us see all new instruments, consider new drugs, receive hints from our laboratories, and perhaps have deliberate debates or conferences given over to some single agent, or to the treatment of some one disease, with the sharpest criticism upon supposed results.

As an example, I would like well to learn whether all of you accept the present views of the value of strychnia and the theory of its action, and to hear your evidence thereon.

Not less would I like such a conference with some surgeons added on the value of ovariotomy as a therapeutic measure in insanity. I mention these as illustrations; but your ideas as to exclusive diets in nervous maladies would be as interesting.

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can keep the head quiet by resting it against some object, and sometimes will rest her head against the wall, for this purpose. The left sterno-cleido-mastoid muscle is markedly hypertrophied and is tender to handle. Pressure over the spinal accessory nerve does not arrest the spasm; it rather brings it on. There is pain at the insertion of the right sterno-mastoid muscle, but none in the left muscle. No contraction takes place in the trapezius muscle and it is not hypertrophied. The voice is unchanged and there is no laryngeal spasm.

The urine contains neither albumen nor sugar.

Dr. Harlan, one of the surgeons at Wills Eye Hospital, kindly examined the patient's eyes, and reported that the optic discs were nearly or quite normal. Vision R. $\frac{20}{30}$, L. $\frac{20}{40}$.

The patient is nervous and inclined to be hysterical.

DR. DERCUM mentioned a case which was relieved by nitrite of amyl. He said, however, that the case was specific in nature. Iodide of potassium was afterwards given, with satisfactory results.

DR. MITCHELL believed that gelsemium, in exceedingly large doses, was the best remedy for such cases.

THE PRIMITIVE FISSURES OF THE FŒTAL BRAIN.

DR. A. J. PARKER made some remarks on *the primitive fissures of the fœtal brain.* These fissures appear very early in fœtal life. He did not believe, with some, that they were due to hardening agents, as alcohol and chloride of zinc. He found that these fissures had certain mathematical relations to the brain itself. He regarded them as due to pressure, just as brain flexure is due to pressure. The brain grows under pressure; it tends to grow more rapidly than the skull. Fissures represent retarded growth.

SPECIMENS SHOWING THE LESIONS OF SNAKE VENOM.

The President invited DR. GUY HINSDALE to exhibit to the Society some mounted specimens showing the lesions of snake venom.

The specimens were obtained in the experimental laboratory of Drs. Mitchell and Reichert, in the University of Pennsylvania, and illustrated the ecchymoses seen in the lungs of rabbits into whose jugular veins venom had been injected. The appearances are striking, the blotches of extravasation being in marked contrast with the surrounding lung tissue. The colors have been preserved by filling the large cells with a fluid composed as follows:—

Glycerin..... .....O.ss.
Dense solution Gum Arabic..... ....O.i.
Saturated solution Acetate of Potash..... .....O.iss.

The cells are made by cementing to a square piece of plate glass a rubber ring, five inches high and five broad, covering the cell, when filled with the fluid, with a round cover-glass. These cells are four inches in diameter. The cement used is known as 'Van Stan's Stratena," and being made with acetic acid, is not affected by the fluid of the cell. Before the rubber ring is fastened to the glass a triangular cork is cut in it, at two places, so that if the fluid becomes discolored, as in mounting specimens too quickly, the original fluid may be drained away and fresh fluid supplied. Large hypodermic needles and a syringe are of use in this operation. Air bubbles may also be removed in this way. The specimens exhibited have been mounted for only one month, but they are apparently as fresh as ever.

The eight specimens exhibited the lesions of pure venom of the rattlesnake, the lesions of the three globulins, and the peptone which compose the poison.

PROCEEDINGS OF THE SOCIETY OF MEDICAL JURISPRUDENCE AND STATE MEDICINE FOR THE YEAR 1884.

Eleventh Regular Meeting, January 10th, 1884.

THE eleventh regular meeting of this Society was held on Thursday evening, January 10th, at the usual time and place. The minutes of the preceding meeting having been read and approved, the Society listened to the report of the Board of Trustees, which announced the next meeting of the Board for Feb. 8th at 8 P.M., at the residence of Dr. Spitzka, their President.

The election of members being next in order, it was moved, seconded, and carried that the Secretary of the Society cast the vote of the Society in favor of Drs. Penard and Nachtel, of Paris, as honorary members. This being done, these eminent gentlemen were declared elected to honorary membership. The PRESIDENT-elect then delivered the inaugural address, after which the Society listened to the reading of a paper by Dr. E. C. SPITZKA, entitled "Execution of an Insane Murderer."

INAUGURAL ADDRESS.

BY

HON. WM. BARNES.

GENTLEMEN:—This evening is the anniversary of the first regular meeting of the Society of Medical Jurisprudence and State Medicine. I can congratulate the members upon the marked success achieved by the Society during the first year of its existence. In the numbers of its membership and the able character of its many papers, and the learned discussions thereon, probably no similar organization has ever been more successful during its birth year. A short recapitulation of its proceedings may not be inappropriate to-night. The meeting of January, 1883, was opened by an inaugural address by the Chairman of the Board of Trustees, Mr. George P. Avery, which was published in the AMERICAN JOURNAL OF NEUROLOGY AND PSYCHIATRY. The By-laws of the Society were also discussed and the officers announced for the current year

A paper was also read at this meeting by Dr. Jarvis S. Wight, Professor of Operative and Clinical Surgery at the Long Island College Hospital, upon the subject of "*The Bearing of Illusions and Hallucinations on Testimony.*"

In this philosophic and discriminating paper, the author broaches a discussion upon a subject which has hitherto met with but little attention by either the medical or legal profession. The testimony of sane witnesses has generally been assumed by the bar and bench and by the public to be of a character importing absolute verity to the same extent as a mathematical axiom or a scientific

truth, unless the character of the witnesses is impeached, or they are held guilty of the crime of perjury. It is clearly shown in this paper that various "*Illusions*" and "*Hallucinations*" of both the physical and moral senses may intervene to sway and influence witnesses to such an extent as to grade their testimony into several degrees of credibility. It should not be assumed by judges and juries that the testimony of A to a certain fact is to have the same weight and influence on the determination of an issue of fact as the testimony of B; in other words, that each witness weighs just one unit or pound in the scales of justice, and that three witnesses on one side necessarily overbalance two witnesses on the other, to the same extent as in physics three pounds absolutely overbalance two pounds. Color blindness is alluded to as an instance of a physical illusion perverting the testimony of a witness where the color of a signal upon a railroad is one of the issues on trial before a court or jury. It is conceded by Dr. Wight that even an expert witness, of full sanity, may be honestly influenced in giving his expert testimony, by various illusions, delusions, and hallucinations.

It was stated by Dr. William A. Hammond, in the discussion that followed the reading of the paper, that "the correctness of observation by the senses (which after all is relative) depends on the *training* which the subject receives," and he gave a striking historical example of the conflicting testimony of eye witnesses of the same transaction.

The experience of every lawyer teaches him that, in cases of assault and battery, breach of warranty in the sale of a horse, collision of vessels and other craft upon canals, lakes, and the ocean, and in other cases, the testimony of opposing eye-witnesses is almost always more or less conflicting. It is probable that in the near future more attention will be paid by counsel, courts, and juries to the

elements which may influence and pervert testimony; the proper data for more correctly weighing evidence should be brought before a tribunal by cross-examination of the witness or other testimony of a less formal nature than that involved in a direct impeachment of the character of a witness for truth and veracity. The further discussion of this paper was continued by E. H. Benn, Max F. Eller, S. B. Livingston, and Dr. E. C. Spitzka.

At this first regular meeting, a paper was also read by Dr. Landon Carter Gray, Professor of Mental and Nervous Diseases and Electro-therapy in the New York Polyclinic, and physician in-chief to Department of Mental and Nervous Diseases in St. Mary's Hospital, Brooklyn, upon "*The case of Maggie Kepple, the Brooklyn Child-Abductor.*" The author, in a thorough and elaborate report, decided that the woman was afflicted with chronic mania and confusion of ideas. The case will well reward the alienist by a careful perusal of Dr. Gray's paper, which was prepared as the result of a *quasi*-official examination of the prisoner for judicial purposes.

At the second regular (February) meeting of the Society, the By-laws were again discussed and as amended adopted, and the Board of Trustees were directed to take the necessary steps for the incorporation of the Society. The paper of the evening was prepared by Dr. William A. Hammond, Surgeon-General United States Army (retired list), Professor of Diseases of the Mind and Nervous System in the New York Post-Graduate School, etc., entitled "*A Case of Intellectual Monomania with Mental Depression.*"

One of the most striking manifestations of this condition, according to the learned and experienced author, is the *delirium of persecution*, which beginning with mere illusions and hallucinations of the sight, but oftener of the hearing, finally obtains complete mastery over the reason.

After giving, from his always full storehouse, several interesting cases of this form of dementia, Surgeon-General Hammond records the particulars of the case of Ernst Dubourque and his wild assault with a pair of carpenter's compasses upon half a dozen women (one of whom subsequently died) in broad daylight in the most crowded part of 14th Street in this city, in October, 1882. Quite an extended discussion followed as to the legal responsibility of the Corporation of New York City for damages under the circumstances detailed by Dr. Hammond; several physicians and lawyers taking the ground that the city of New York ought to be, and in fact is, liable for damages to individuals committed by lunatics under such circumstances. The question of corporate liability would seem to be hardly a debatable one, the city not being charged either by the common or statute law with the constant duty of ascertaining correctly which of its million inhabitants are insane or *non compos mentis*, and of physically restraining all such persons from the commission of any injuries to its citizens. So far as the State or municipal government is concerned, such cases are doubtless those of the class styled *damnum absque injuria*.

Indeed, as an original proposition, it would not be practicable by legislation to create any such liability without great danger of financial ruin to all municipal corporations, as stated in the debate by Mr. J. B. Leavitt.

The third regular meeting was held on the eighth day of March, 1883, at the Academy of Medicine. The Board of Trustees reported that the Society had been duly incorporated and its Articles of Incorporation were read. The corporate existence of the Society dates from March 5th, 1883.

The paper of the evening was read by Max F. Eller, of the New York Bar, associate member of the Massachusetts Medico-Legal Society, member and trustee of the New

York Society of Medical Jurisprudence and State Medicine, and was entitled "*Medico-Legal Features of the New York Penal Code.*" The familarity of the learned author with European codes, especially with medical jurisprudence in Germany, is highly appreciated by his brother members of this Society. It will not accord with the design of this short address to review at length the subjects discussed by Mr. Eller in connection with the new Penal Code and the Code of Criminal Procedure of the State of New York. The celebrated codes of the emperors Theodosius and Justinian were promulgated thirteen or fourteen centuries before the first code of New York (in 1848). The Roman Civil law, thus, after the lapse of more than a millennium, triumphs, in form at least, over the common law; and the whole body of the laws of New York and other States seem destined sooner or later to be digested and collected under the form of various codes.

The sharp criticism of Mr. Eller on Section 661 of the Penal Code, by the provisions of which it is virtually left to the discretion of the Superintendent of an Insane Asylum to determine the period of the expiry of the insanity of an inmate, seems to be well founded, and some form of judicial and medical inquiry should be established for the determination of such an important change in the civil status and condition of a patient. The time when insanity ends and sanity begins in an individual may often be as important and serious an inquiry as the period of its commencement. The provisions of Section 22 of the Penal Code, by which the doctrine is reaffirmed, that intoxication is not a justification for crime (although a mitigating circumstance in some cases) will certainly meet with approval. Whether inebrity is merely a sin or a disease, unless it is so confirmed as to render its subject insane, it cannot be accepted as a defence for the commission of a criminal offence without disarranging the mechanism of

society and relegating the community to the primal principle of self-protection of person and property.

The most expedient method of lessening and if possible of extirpating the evils of intemperance is still an unsolved problem for the physician, the lawyer, the political economist, and the statesman. The right of the commonwealth to protect itself from such evils as follow in the train of intemperance must sooner or later be admitted, and all of the necessary power for this purpose either is, or must be, incorporated in the State Constitution. Our Society is not merely medico-legal, it is also an organization comprehending the very extensive field of state medicine, public hygiene, and sanitary science as applicable to State and municipal legislation. This subject is therefore entirely germane for examination and discussion in all its bearings at our meetings. The main burden of the initiative will, however, rest upon the medical members, as the true road to reform lies in a scientific demonstration, so plain and unanswerable as to convince the masses of electors of the malign influences of inebrity upon the moral sense and physical systems of its devotees and slaves. When, as a mere matter of pure and abstract science, medical men unite in a universal verdict upon this subject, lawyers and legislators can and will easily devise such constitutional and legislative measures as will protect both the State and its citizens from partial ruin and destruction.

Those members of the community who are afflicted with yellow fever, leprosy, small-pox, cholera, or other contagious diseases, can be segregated from their fellows and the causes of the disease destroyed by the whole power of the State. If similar evils exist, although of a more insidious character, yet when the facts are plainly demonstrated, society has the right and will assume the burden of the duty to apply similar effective remedies.

The fourth regular meeting of the Society was held in

April last, at which the President delivered his inaugural address. At its conclusion, a discussion took place on the subject of expert testimony, which was participated in by several members.

Dr. Jarvis S. Wight, of Brooklyn, insisted on adequate knowledge and special training for experts and a mastery of the literature of the subject under examination. Mr. Max F. Eller favored the appointment of an official board of medical experts, as in Germany and France, but disapproved of their selection by the judges upon the ground of the incompetency of lawyers to decide upon the medical qualifications of a candidate and the danger also of the selection of some judges of "*political doctors.*"

Several members were inclined to preserve the advantages of a rigid cross-examination of medical and other experts and therefore sustained the present system.

It would doubtless be exceedingly difficult to accommodate American ideas of litigation with any system of *quasi*-judicial witnesses, not subject to cross-examination. The best practicable remedy for present evils would seem to be, as our By-laws specify, one of the objects of our organization, namely, "the attainment of a *higher standard of medical expert testimony.*"

A special meeting of the Society was called for, April 20th, 1883, at the rooms of the Society, for the purpose of hearing a paper by Professor Stephen Smith, M.D., Commissioner of Lunacy of the State of New York, upon the subject of "The Lunacy Laws of the State of New York, as Regards the Provisions for Commitment and Discharge of the Insane." Commissioner Smith, in his able review of our State legislation regarding lunacy, made the statement that, for half a century, lunatics were regarded by our laws as vagrants and criminals. In the year 1827, a law was first enacted by which it was provided that no lunatic should be confined in any prison,

jail, or house of correction, or confined in the same room with any person charged with or convicted of any criminal offence.

The insane were thus first contra-distinguished from the criminal classes, and the era of humane treatment for these unfortunates was inaugurated in the State of New York. In 1836, an act was passed upon the memorial and petition of the State Medical Society, establishing a State Lunatic Asylum at Utica, and the buildings were so far completed as to justify an organization for the reception of patients in the year 1842.

In 1874, the laws of the State on this subject were revised and codified, the system inaugurated being somewhat analogous to the English laws relating to lunacy. In order to justify the commitment of any person to an asylum, a duly verified certificate of lunacy is required, by two qualified physicians, which authorizes a detention not exceeding five days, unless the certificate shall be approved by a judge of a court of record in the county and district where the alleged lunatic resides.

Where a citizen is forcibly committed to an asylum and restrained of his liberty for an indefinite period (perhaps for life), it is certainly requisite and proper that some judicial finding as to his condition should be regularly made and recorded the same as other decisions of equal importance and solemnity. Several suggestions for improvements in the lunacy code were made by Dr. Smith, in his elaborate paper, which it is hoped may assume the form of statute law during the present session of the Legislature.

Commissioner Smith's paper was very extensively discussed by several physicians of large experience in various asylums in this and other States, and also by several legal members of the Society.

The fifth regular session of the Society was held in May,

at the usual place of meeting. A paper was read by Charles W. Kitchell, of the New York bar, upon the subject of "Prison Sanitation." The reading of this paper was followed by a spirited discussion and the appointment of a committee to consider and report to the Society upon the subject.

The sixth regular meeting was held in June, at the Academy of Medicine. The paper of the evening was read by Dr. E. C. Spitzka upon the subject of "Spinal Injuries as a Basis of Litigation." This subject was treated by the accomplished author with his usual vivacity and ability, and his opinions and conclusions should be carefully weighed and considered by all lawyers who have any litigation connected with spinal injuries.

The seventh regular meeting of the Society was held in September. The paper was read by E. H. Benn, Esq., and was entitled: "Intoxication, its Legal Effects and Consequences." This paper is a very comprehensive statement of the law as to contracts made and criminal acts performed by intoxicated persons.

Except in certain cases, contracts made by an intoxicated party can be avoided at his election, but he is responsible for all criminal acts committed in a state of intoxication, unless the attack has passed into the stage of *delirium tremens* or actual insanity.

The October meeting listened with great interest to an able paper prepared by Dr. N. E. Brill, the Secretary of this Society, being a "Quarterly Report upon Medico-Legal Progress."

At the November meeting, a paper was read by Dr. C. H. Leale upon the subject of "Sunstroke in its Medico-Legal Relations."

At the December meeting, the officers were elected for the ensuing year, and various amendments to the by-laws were discussed and adopted.

The proceedings from the seventh regular meeting are not yet printed, and cannot therefore as yet be critically examined.

The above brief summary of the labors of the Society for the past year will indicate its general purpose and the nature of the work performed. The proceedings are in the course of publication in a volume of nearly two hundred pages, and we shall soon be able to thus exchange our publications with similar associations in this country and in Europe.

It may be worthy of consideration whether, like other parliamentary bodies, a suitable number of regular standing-committees should not be organized, each charged with the consideration of special subjects which come within the scope and purpose of our organization.

Fellow-members of the Society: A new year dawns upon us, with its hopes and its fears and its possibilities. I trust that, when its shadows fall upon us next December, we may be drawn closer together by the ties of association and friendship, and that our Society may have contributed its share of labor and zeal towards the attainment of the beneficent purposes of its organization.

THE CASE OF THE INSANE MURDERER GRAVES, RECENTLY EXECUTED IN NEWARK.

BY

E. C. SPITZKA.

The course of lunacy legislation, not as laid down in successive enactments, but as illustrated in its practical workings, is one of the most remarkable in modern history. It is a series of extreme innovations, and as extreme reactions, without apparently any transition period in which these were properly balanced. There have been periods within the memory of many here to-night assembled when the mere assertion of insanity in the case of a criminal was sufficient to diminish, if not to abolish, his penalty: when medical witnesses construed irresponsibility from the fact that a murderer had dreamed of his brother; when a glance with the ophthalmoscope sufficed to set another free; and when the terms: emotional insanity, transitory frenzy, and monomania, were abused, until their honest employment became almost a reproach. There have been other periods, within the memory of all of us, at the height of the reaction against these medico-legal excesses, when the most solid and scientific evidence of insanity became disregarded; when the defender of an insane criminal became as much an object of execration as his collegue, in the previous period, had been one of commendation and emulation; and when the highest mead of praise was given to opponents of the insanity theory carried on the topmost crest of the wave of public feeling, over every established

dictum of science and beyond, far beyond, the pale of the truth.

Such reactions from such extremes are perhaps natural where a non-expert public sentiment is the ruling and directing factor. But the lunatic is all the time in the position of the boy who gets the blows of two fighting comrades. He does not enjoy immunity in the "sentimental" period, and he gets the full benefit of the reaction in the "indignation" period. The ideal insane murderer of the sentimentalist is always more or less of a dashing, an attractive, or at least a prominent personage. His crime must be dramatic, it must appeal to the romantic female, and it must be neatly done. The real lunatic, unfortunately or fortunately, is not often a dashing, much less frequently a fascinating, and most rarely of all an influential creature. His crime is commonly revolting rather than dramatic, commonplace rather than romantic, and brutally performed instead of æsthetic. While, hence, he does not appeal to morbid or superficial sentiments, his pocket rarely contains the wherewithal to appeal to any other feelings.

In the reaction period it is not difficult, in view of the outcry against the "insanity dodge," aided by a prosecutor desirous of making a good "hanging record," to cure any lunatic, except the most absolute dement or imbecile, of his insanity, through lay and medical testimony—and after curing him, by the fiat of the jury, to hang him in a sane frame of mind. I am not here exaggerating an iota. It is in a published record of a trial in whose course public feeling rose high in case of a murder, brutal in its character, and exasperating through the lack of provocation by the victim, that when it was proven that lunatics were found in every branch of the family of the accused, "experts" could be found to testify that there is no hereditary insanity, that no disease of any kind is ever transmitted, and that it is of no

importance in an inquiry whether a given person has insane relatives or not. When it is proven that a person has been odd in his behavior, and eccentric all his life, such "experts" can be gotten to testify—I quote *verbatim* from a trial record—that "illy-balanced people are less likely to become insane than well-balanced people," and so on *ad absurdum*. Man is weak, the creature of the moment, and the feeling of a community is infectious to every member thereof. This is the excuse which may be offered in extenuation of such offences against medical truth. Perhaps this further excuse may be offered for them by utilitarians, that as the lunatic is rarely a useful member of society, those who deny, conceal, or misrepresent his insanity do less harm than those who let loose a sane murderer on the false plea of insanity. What extravagances are being committed and attempted in this direction can be gleaned from the fact that recently, within a radius of ten miles from where we are assembled, two policemen having been guilty of murder, the same lawyer defended both, the same plea—that of insanity—was made without ground, the same "experts" appeared in both trials, and both testified to the same form of insanity as existing in both criminals.

I said a moment ago, that, under the influence of the reaction against the insanity plea, juries had succeeded in curing every form of insanity except absolute dementia or imbecility. That, however, it is not impossible to render a person deeply sunken in dementia a proper subject for the gallows, it was left for the Governor and the Court of Pardons of a neighboring State to demonstrate within the past month. The features attending the denial of a reprieve, and the execution of James Graves, recently hung in Newark, are so startling and constitute such a significant commentary on the fallacy of certain attempted reforms in our expert system, that I may be permitted to

occupy your time this evening with a history and commentary of them.

James Greaves, or as he afterwards wrote his name, James Graves, was born in England in 1818, and came to this country with his father in 1825. Two of his brothers joined the Shakers. He himself was apprenticed as a wool-carder.[1] During his younger days he wrote a journal, or sort of autobiography, of which portions are here to-night. Its contents show that James Graves was at that early period a weak, vacillating, and eccentric character, filled with projects whose insane execution I shall afterwards refer to. The main contents relate to habits of self-abuse, which, as he testified on the stand, with cynical coolness, he had practised nearly all his life. To give an idea of the obliquity of his mind at this time, permit me to reproduce a portion of his autobiography, in its original, badly spelt, and ungrammatical English. The outside of this fasciculus of the autobiography contains the following words, in Graves' handwriting, "the history of that singular man continued."

"The next day i sent her a valentine, i wrot on it these lines o dear o me—what can the mater be—the mater is i want a wife—in fact i am tired of a single life. in a few days i took her to exebition, i may here remark, that my sexuel desires was so great and i thought so much about giting maried, that i did not sleep much nights, as a consequence i begun to git nervous, so that the night i took my girl to the exebition i nervous and dejected, my lady saw that i was not well sighed just as women do sometimes; when i took her homm." . . . "in 3 weeks from the first time i went with her, i went to another temperance meeting with her—at parting i made bold to kiss her but i think i made a poor job of it i was so nervous i did not half kiss her. one sunday after noon a young man went to her hous to spark her, she came to me her bosoom heaveing with love like a (illegible) full of gelley and her cheeks a little red i fact she looked very enteresting, she sometimes gave me some hints the meaning of which was that i could have her for my wife, i was now giting a little

[1] Trial Record, pages 103–104.

bold, she came to me one day all smiles with a paper i had lent her, i asked her to go to a exebetion of chinese, but the very same day, she slighted me to bad for my suscepteble hart, her object no dought was to spur me up a little—" . . . "he gave me a good recommendation, when my girl heard of it her love all fled. at this place i was called a very likely and engenuous man and the best carder thay ever had, and i had better health than i have had scince i was a man, i also menidged my help to a charm bouth girls and men 9 pownds of flesh as i walked up and down my room with a easy and plesent and stern manner i thought i that i was the nepolion of carders."

After another passage relating to his habit of self-abuse, so detailed and disgusting that I hesitate to reproduce it, he goes on in this strain:

"if i saw a man and woman walking together it would nearly sett me to cryeing and i bothered myself about the girl who had slighted me at Baldwin's mill, but i began to think that it was foolish in me to worry myself so about things that i could not help one night a young man that sleeped with me poluted himself but he did not show the affects of it in his actions in one sence man is the most imperfect of gods works, man should have been formed, so that he could not polute himself in may i went to see a man tryed for ceduction the girl had to tell how many times he had connection with her wich she did with the geatest composure and the man looked as though he had been doing something wich he had reason to be proud of i think that sexuel indulgence makes bouth man and woman bold, and sometimes impedent i thought i was quite safe from being taken up for seduction, i wondered how i should look if i was taken up for polution i think i should not look very bold i have got some work at spinning in Utica my lock was picked sir.

The above are a few samples of his style, and illustrate the general tenor of the autobiography. Self-reproaches regarding his disgusting habit alternate with theological, reformatory, and mechanical speculations. In many places, he speaks of his nervousness, of dyspepsia, and of "palpatations" of the heart. He abandoned many good "jobs" because he had attacks of shamefacedness, as he calls it. This feeling, illustrated by the mask episode of

his later career, is aptly expressed in the following incident:

"a man told me that thay wanted a weaver and carder in Oswego i new very well that i was in no fit state to look after a lot of girls i had some experience in that line of buissness before, but i concluded to try it, so i paid my bill at the tavern and went to bed as i was to start at 3 o'clock in the morning as i was going out of the tavern so early in the morning i felt very nervous and figitty as i thought in was in danger of being taken up as a rober, but i went out in my stokings and did not create any alarm i do not think that a rober ever felt as nervous in robing a hous as i did in going honestly out of that tavern."

Perhaps no better passage, illustrating the peculiar character of persons addicted to the injurious habit spoken of by Graves, and particularly by those in whom it is rather the result than a cause of nervous derangement, is the following:

"i tryed to find out whare the —— houses of the city ware, i had heard that there was some but i did not mix in the company of young men enough to get introduced to one of them, my habits ware to soletary, and i was to timed (timid), this was much agrivated by my high sense of honor, and justice and my disguist of the meanness and perfidy of the inhuman race as a whole."

It may seem strange that such a subject should seriously assert "his high sense of honor," but the alienist recognizes the abnormal earnestness and good faith of the claim, and discovers in it one of the characteristic features of insanity of pubescence and masturbation.

Graves was undoubtedly possessed of some mechanical skill. He was one of those persons who dabble in everything—a little of a joiner, a tinker, and a machinist, and, as usual with such persons, Jack-of-all-trades and master of none; in short, the "lawyer, theologian, and politician" translated into the sphere of manual labor. It was shortly after the period covered by the autobiography above referred to (1852–1853) that he went into the inventing line. There can be found hosts of similarly crazy

inventors in our lunatic asylums, whose inventions are at least as useful and practicable as those of Graves. I show you here his "perpetuum mobile." This consists of a tin frame, and a number of alternate movable and immovable strips of tin running across it. This was to be attached to the bottom of a vessel; the water was supposed to rush up over the immovable segments, and, coming down, to close the movable ones; the latter were then to open by the rebound, and a current was thus to be created. Assuming that this apparatus could once be started and kept in operation, it would move a vessel about two feet an hour.[1] The other invention was called the combination gun and revolver, with the new patent sight. The revolver portion consisted of an old revolver—a relic of the late war—and was the same instrument with which he shot Soden. I am unable to show it to-night, as it is in possession of the authorities. It was inserted in the stock of this gun, which, as you see, can be folded up. If employed as a gun, the bullet was supposed to fly between two strips of metal, the barrel being open above and below. This jointed portion in front of the muzzle, which I first took to be an abortive bayonet (illustrating), is the "new patent sight."

The following extract from his autobiography seems to indicate that he obtained the inspiration for his strange gun during the civil war.

1852 to oswego, carding and weaving, took girl to theater, told me make a good wife. March 1852 April, went to utica, worked in the screan factory, burned, a mick (mad as a hopper) in august worked in lock factory, fiting wagon skeins, 18 months bought a house fixed it up, improvemt, got discharged to give a favorite a job worked at hous painting 1855. my dear mother died may 11 (lef 300 in bank) as matron of hospetel worked her self to death 1856 worked in machine shop, asked a girl to go to a fair whith me, very kindly refused lucky for me, should make a fool of myself

[1] The various models were exhibited to the Society.

man tryed to have me court his daughter to timed[1] Boarded myself in my house, feather lived with me sometime on mothers mony (had old habit.) machine shop stoped, worked at hous painting 1858 girl sent me a saucy valentine, 1859 invented a pump, saw girls that I would like to spark timmed, invented the stoneware barrel for pumps also a force pump. 1861 in august went to washington to get a patent got it also worked for a man who made models for the patent office he died of a fever in a few days october went see the great review of troops by gen maccklen and lincon, carried on the shop for his widow a few weeks, went to her husbands funerel, artilery went before it (written across page: intimate with girl—man died i worked for) funerel over saw a baloon up on other side of river, looking at rebels. December back to Utica, in new york one night very nervous, embraced a woman. 1862. had the old habit, manufactured my pumps, got a sewing girl to make a coat for men (me?) so that I could court her, timed again. 1863 dredfully frightened, thay had my name on the drafting papers did not draw my name much releived. august went to washington again to get another patent, got it, much interested in seeing the various camps and dead bodys in patent office, heard the last battle on the retreat to washington, saw a train of wounded come in one man dead, awfull sight, shot through neck, 1. leg off. September 17 started for harper ferry walked with a soldier a stragler

wanted me to give him money. no, heard the battle of antietem soldier stoped to talk with some men i went on to get away from him said he catch up, got out of his sight, and hid myself till he went past staid all night a cockvill next day rode with a suttler to frederick heard of the great battle 19 went to south mountain bat field 20 on antietam Bat field hored sights, sunday went to shepards town on the potomac river, saw rebels on the other side, flag of truce heard rifles fired off went in to the see the union army thay fired shells at the rebels, got taken prisernor a little frighten, taken to headquarters, got to my lodging in sharpsburg at 10 P.M 21 went to harpers walked with gen meagers reg saw a sutter robed on the way 22 went to see the battle field of harper's ferry on top of a mountain. grand cenery—saw 2 dead 1 burned except bones other singed, nails of feet sole of 23 to baltimore took lodgings made a dish of tea, 24 to philedelphia hired a room board myself got work at a U. S. arsenal cleaning muskets, man wanted me to spark his wife sister where i hired a

[1] Too timid.

room a good girl, i went to dance houses laid with some night girles made a pump and tryed to sell patent right no sucsess.

A third "patent" was that of an ordinary pump, to whose construction Graves had devoted extra care, and which, in two or three instances, as attested by certificates, worked excellently. I pass around among you his circular advertising and illustrating said pump, and issued in 1874. As shown at the trial, however, he frequently failed to make his pumps work at all, or only after much tinkering.[1] In what estimation he held this remarkable device, may be gathered from the following, one of several pieces of doggerel singing its praises.

HOW TO TRY MY FORCE PUMP.

first fix the hose to the spout all RIGHT
then work the handle with all your MIGHT
then rais your nose towards the SKY
and see how the water will FLY.
the height can be over sixty FEET
for my pumps cannot be BEAT
you should then lower down the HOSE
and see how the great pump THROWS.
it can throw over seventy FEET
and will do it very NEAT
if wondering men should stand NEAR
let off the gass without any FEAR.
for my Pumps where at the state FAIR
and did cause a very funny SCARE
the scare did soon become a PANIC
and all through a greasy MECHANIC.
three days fight made the panic a ROUT
and Mr. C, quickly did skedadle OUT
many tiping buckits where THERE
and thay blowed about fresh AIR.
my Pumps secure it and keep out CATS
and this is one of my great FACTS
thay where eloquenty I must CONFESS
thay beat the great Uticaen Mr. S.
the fair was held near Utica CITY
which is governed by king corn WHISKY
now at that fair I was not BEAT
but came out on the top of the HEAP.
in fact my Pumps are truly GOOD
if you yet dought, just ask Mr WOOD
and now, if mony you wish to MAKE
these Pumps are shure, very shure to TAKE.
buiy a Patent right as quick as you CAN
and you will soon be a very rich MAN
and will not be made a cheat by SHODY
and need not cheat any BODY.

In 1868 Graves rented a room of a Mrs. Podmore, in

[1] Page 64, trial record.

Newark, and when she moved to the house where his victim resided, he accompanied her. He seems to have been in ill health, dyspeptic, and melancholy more or less through his entire stay in that city. About a year before the murder, he obtained a mask, and went about the streets playing a violin. *The mask he wore because he felt ashamed to show his face.* He also made a proposition to an auctioneer to use his sales-room as a concert-hall, two cents to be the price of admission, one-half of which was to be the performer's and the other the auctioneer's share. The only performer was to be Graves himself, and he did not know how to play on his instrument.[1] Being told that he would be fined if he continued playing in the street in his mask, he abandoned this new occupation.

There was considerable evidence brought out during his trial to show that he exhibited considerable lack of judgment and tact, not only in mechanics, but in other matters.[2] By more than one, if not by all persons who knew him, he was considered deranged more or less.[3] That the street-boys who unwarily admitted having annoyed him on the street, owing to his comical looks, should deny ever having called him "crazy Graves," will strike no one with surprise.[4] It was admitted on all sides that he was

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[1] Trial record, pp. 65, 66, 67, 76, and 83.

[2] Trial record, pp. 71, 75.

[3] Trial record, pp. 80, 100, 94, 95, 101, 102.

[4] The reliability of these witnesses may be gleaned from the following:

Q. You boys used to give him a great deal of trouble down there?

A. No sir; I never have. I have been with the boys; and always, for the last seven years, *I have never heard any of the boys say anything.* I have heard them talk *to themselves*, and called him "monkey" and several names.

Q. What other names?

A. "Mr. Graves" and "Old Graves;" like that.

Q. Did they ever call him "Crazy Graves"?

A. No, sir; never called him so, *and never thought so.* We just called him those names, not to *himself, only conversing with each other*, if we would see him coming down the street. He had a funny movement, always making his mouth go, such that some of the boys laughed and used to talk of him in that way, but never to his face.

called "monkey Graves," and hooted and jeered at by the street Arabs of Newark. In his intercourse with grown persons he was quiet, yielding, and never exhibited any quarrelsome tendencies.[1] He was abstemious. Several of the witnesses, in describing his mental state, spoke of him as an oddity, as silly, nervous, devoid of judgment, enfeebled in memory, and incoherent in conversation. He was stated to have carried his head in a peculiar way, and to be continually muttering to himself, his mouth working in such a way that almost all of the witnesses had observed it, some saying that he apparently chewed his tongue, and others that he mumbled to himself.[2] This habit continued to the hour of his death.

It appears that Graves was subjected to a great deal of annoyance by the children residing in the neighborhood, and particularly by the younger members of the Soden family. They hooted at him on the street, they blocked the steps when he was on the point of entering or leaving the house, and a half-grown daughter of that family repeatedly threw sand into Graves' room, and when Mrs. Podmore took the latter's part, she came in for a share of these attentions. How many more Graves are there in our community? How many more or less deranged persons are there not who are the butt of the thoughtless? And what a tragical lesson the Soden murder presents to those parents who allow their children to grow up as a hundred thousand are growing up to-day, the terror of orderly citizens, the scourge of the cripple, the aged, and the insane!

On more than one occasion, when Graves administered such chastisement as the feeble old man was capable of inflicting, the father of Soden took him to account. That I make no commentary on this phase of the matter you

[1] Ibid., pp. 81, 99.

[2] 64, 73, 75, 80, 99.

will all understand, in view of the terrible affliction this unfortunate man was soon to experience. Graves went to his room for the pistol, which, as I have mentioned, formed a part of his "great gun-revolver combination," and said to Soden the elder: "If you ever come down again here to pick a quarrel with me for nothing I will shoot you." Soden replied, "shoot away." "No," rejoined Graves, "I don't want to kill you." Soden then obtained the services of a constable, and Graves was fined five dollars, a sum which happened to be exactly equalled by and to exhaust his financial resources.

In consequence of this and similar quarrels, Mrs. Podmore, in her own interest, asked Graves to move elsewhere. This seemed to rankle in his mind. The exact reason for his committing the deed for which he was executed was never learned; that he had a strong feeling against the Soden family is evident; that he deliberately loaded his revolver, lay in wait for his victim, ran up behind him while the latter was lighting a lamp, put the muzzle of the revolver close to his back and fired, with the intention of killing him, is equally evident, and was frankly admitted by the prisoner and not disputed during the trial. The murder (for young Soden, a youth of thirteen, died a few hours after the infliction of the wound) was committed in one of the most crowded streets of Newark; the prisoner made no attempt at concealment or escape, but was on the way to give himself up at the police station when arrested. He said after his arrest that he had fully counted the costs of his undertaking.[1]

The main facts elicited in the trial have been briefly recorded above. It remains to speak of the medical testimony and that given by the prisoner himself. The latter stumbled through his statements, showed much hesitation and

[1] The murder occurred on December 20th, 1881.

some defect of memory, a tendency to wander away from the point, and altogether made a silly exhibition of himself, as more than one of the eye witnesses remarked, and as is evident from the printed testimony.

The prosecutor, Mr. Abeel, a gentleman of high ability, cross-examined the prisoner with skill and employed a species of irony which evidently was altogether unobserved by the prisoner, though it certainly did not fail to have its desired effect with the jury. He asked the prisoner, who himself alleged that "he must have been mad" and "crazy," whether he had an "irresistible impulse;" the prisoner blundered into an affirmative answer, having previously given entirely different reasons. Mr. Abeel asked him whether the "Deity had anything to do with it." There was probably not a person in the court-room except Graves but understood the reference to the Guiteau trial, and the artful attempt to bring to bear against the insanity plea in his trial some of the odium attaching to the same plea in the Guiteau trial; for Graves answered, with the greatest simplicity, in the negative.

The following (from the trial record, page 117) may be of interest:

Mr. ABEEL: You were in a passion?

A. Well, I think—no; I was not in a sudden passion.

Q. But a long and reflecting passion?

A. I had a fit of despair—melancholy—desperate, thinking over my grievances.

Q. On being turned out of the house?

A. Oh, various kinds.

Q. On being turned out of the house?

A. Oh, no.

Q. The trouble with the Sodens?

A. The grievances was the trouble with the Sodens. I suppose that must have been the whole thing.

On the direct examination, he testified much like the following (page 106):

Q. You never were married?

A. No.

Q. Was there any particular reason why you did not get married?

A. No reason only what springs from that, timid—timidity.

Q. How did that interfere with your getting married?

A. How does that interfere? Well, if a man's afraid to do anything, he's afraid. I don't know really of any further explanation. If a man is afraid to do anything, he's afraid; ain't he?

Q. From thence where did you go to?

WITNESS (Graves): Where did I go to?

Mr. KALISCH: I believe it was Bloomfield—Waterbury.

A. Well, from there he went to—let me see—you'll have to have a little patience with me, my memory ain't very good; it takes me some time to think of things sometimes. I will think in a moment. Let me see. Where did I get to?

Mr. KALISCH: Waterbury. Where did you go next?

WITNESS: Oh, went to Worcester, Mass.

The physicians called by the prosecution were Drs. Wm. O'Gorman and D. Hewlett, the latter the county physician. Dr. O'Gorman testified that the prisoner was in a weak physical state, showed the effects of his unnatural excesses, exhibited some mental weakness, but he did not consider him technically insane. Dr. O'Gorman, a few years later, formed an opinion that Graves was passing into dementia, and was foremost among the medical men who attempted to have Graves' sentence commuted. Dr. Hewlett, who examined Graves with Dr. O'Gorman, testified that he failed to find any evidence of mental unsoundness in him at that time.[1] On cross examination, Mr. Kalisch, counsel for Graves, elicited the fact that Graves had called at Dr. Hewlett's office, five or six weeks before the shooting, to consult him about his dyspepsia, that he found it difficult to get rid of him, and had expressed himself that Graves was a "crank" and "as crazy as a loon."[2] Dr. Hewlett, like Dr. O'Gorman, later on joined the ranks of those who believed Graves to be verging

[1] Trial record, p. 126.

[2] Trial record, p. 135.

on, if not already far advanced in dementia; and had the opportunity of witnessing the material confirmation of this opinion by the autopsy.

Graves was found guilty and sentenced to death. The efforts of his counsel to obtain a reversion of judgment were unavailing, and the first of January, 1884, had nearly been reached, Graves having still four days to live, when I was requested to examine the condemned by his counsel. He had been previously examined by seven physicians from New Jersey, selected, I believe, by Governor Ludlow, and designated by him as experts. Several were asylum physicians. One of these, the chief one, employed an ophthalmoscope, "to study the operations of the brain," as a Newark journal has it, and reported to Governor Ludlow: "That man's brain is as sound as yours and mine is." Let it be borne in mind that the subsequent post mortem showed that the brain was atrophied, that there were both internal and external hydrocephalus, and softening, as well as cicatricial induration of parts of the intellectual organ. It is hence to be hoped that the expert was wrong when he placed Governor Ludlow's and his own brain in the same category as that of Graves.

Another expert appointed by the authorities, and whose opinion was laid before the Court of Pardons, was the editor of the *Newark Daily Advertiser*. Gentlemen, I am not romancing at all. This expert editor, or editorial expert, subsequently to the autopsy, acted as the spokesman of his colleagues. This gentleman and four others reported that Graves was simulating insanity. I, consequently, would have been compelled to direct my attention prominently to the detection of simulation, even if I had not, as is my custom in all criminal cases, resolved to do so before I was informed of these facts.

On entering the room in which Graves was confined, I

found him in the charge of a very intelligent nurse, named Schaff. The prisoner was a little man, whose height (difficult to determine, owing to his bent attitude) I should have estimated at about five feet two inches. His weight was probably between eighty and ninety pounds. He was lying rather than sitting in his chair, with a pillow under him; his head on his right shoulder, and his lips moving occasionally. He had been in no way apprised of my coming, and could not have been so apprised, owing to the brief notice I was able to give those who solicited my attendance. Graves was almost entirely bald, his eyes small, and his vision weak;[1] his expression was vacant, and complexion sickly; there was a large scar left by a carbuncle over his forehead, and a similar, but larger one, over the right mastoid region. On compelling him, by persuasion, to rise and walk across the room, he did so, with a slow shuffle and in evident pain, moaning plaintively. His right arm was in a position resembling a flexor and pronation contracture. Unfortunately, owing to the prisoner's dementia and the absence of certain instruments, the existence of paresis was not determinable. The main symptom noticed, on examining Graves, was a difficulty in arousing his attention and in keeping it fixed on any subject. He frequently forgot an inquiry before he could muster up his recollections sufficiently to answer it. He did not recollect the year of his birth, the name of his victim, the street he shot him in, whether he testified in his own case or not; he knew the name of his lawyer, but did not recognize him. He knew that he had shot a boy, that

[1] In confirmed masturbators vision is often weakened. In one case I found complete abolition of vision in the peripheral fields, only central vision persisting. There was no abnormal appearance of the ocular background, the papilla being of the extremely pale kind. It may be interesting, in connection with the subsequently discovered lesion on the internal face of the occipital lobe, to note that the prisoner correctly discriminated between red and green, calling the former "brown." He had had "visual phantasms," in the shape of "sparks flying upward" at night.

he was going to be hung for it, but did not know on what day he was to be hung. His nurse informed me that, the day before, he had expected to be executed that afternoon. He expressed some irritation at being examined at such length, being—as his nurse explained—exhausted by repeated conversations held with him the day before and the same day. He endeavored to put off searching inquiry by the set phrase: "It does not make any difference, that I know." He appeared disinclined to talk about his inventions, did not remember the "perpetual-motion" apparatus, but recollected his "gun." He said that people knew of his gun, there was nothing extraordinary about it, and it was not worth while bothering him. After repeated failures to engage him in any continuous, coherent mental effort, I approached a subject about which he had been reported as maintaining a "shrewd" conversation, and proving himself the "master of Chancellor Runyon," namely theology. He was irresponsive and irrelevant in all his replies, until I asked him: "Are you sure there is a future state?" He looked me squarely in the face, as if challenging me, and said: "No; *are you?*" There was a flash of keenness in the retort, unusual to him; but when I followed it up, with the argumentative assertion that I *was* sure, he relapsed into his apathetic state, here, as elsewhere, losing his thread. He knew, or rather inferred, that I was testing his mental power, for when I asked him whether he knew what I was sent for, he said, "it is for my senses, to see if I have my senses."

The nurse informed me that he was then in better physical health than he had been six months before, when he was greatly reduced by the carbuncles whose scars I had observed. He was unclean, urinating promiscuously, and it was only by incessant attention that he could be induced to attend to the calls of nature properly. As it was, he suffered from incontinence of urine, and was compelled to

rise four times at night frequently to empty his bladder. One physician was said to have discovered diabetes; I was unable to obtain any of his urine for the purpose of testing this assertion.

The nurse informed me that he had never during a period of nearly a year observed any inconsistency in Graves behavior.[1] That on the whole he was incoherent, lost the thread of conversation, had not acquired any new recollections, that his memory was weak, but that he showed occasional evidences of "shrewdness," such as the one I had elicited. He informed me that many of the affirmative answers given by Graves were incorrect. I had asked him whether any clergyman had visited him, and he had replied "yes," but it seems that the only person who had called on him at that time was one of the freeholders of the county. He had the governor, counsel, chancellor, experts, and warden all confounded.

Altogether, I have never, in an extensive experience with insane criminals, seen as wretched a spectacle as this of Graves, an acknowledged invalid, treated and nursed as a lunatic, with only an occasional flash of intelligence to illuminate the night of mental darkness, awaiting his execution. If there ever was room for executive clemency,[2] aside from the question of insanity and irresponsi-

[1] Dr. Alexander N. Dougherty, since deceased, the only medical witness who testified for the defendant, expressed the following impression, which harmonizes with the writer's view of the case, and is of value, inasmuch as it was based on a careful examination of the prisoner, about the time of the shooting: "He seemed to group the whole family together in one, and make any member of it responsible for any suffering he had endured from the family. I noticed that his story was consecutive and connected. His memory was good of all these occurrences. About the only thing that I could see in his case was a singular obtuseness as to the proportion between his act and the sufferings that he had charged upon the family. He seemed to think that he had done nothing but what was right under the circumstances."—Trial record, page 121.

[2] The Newark *Free Press*, of December 30th, 1883, said: . . . We had good reason to believe that Graves was not whole-minded, and that he would not be hanged. We so expressed ourselves. Subsequently, Graves was visited, once by Governor Ludlow and twice by Chancellor Runyon. The Governor talked

bility, it was in this case of an old childish man, verging on seventy, and prostrated by physical disease. How im-

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with Graves and used all *his skill as a searcher of men's minds to discover the murderer's mental status.* He came away inclined to believe that Graves was somewhat demented. So with Chancellor Runyon the first time he saw Graves. The second time, however, the Chancellor changed his mind and became satisfied that Graves knew a great deal more than he pretended to know.

Meanwhile a large number of physicians, some of them acknowledged to be experts in insanity cases, visited Graves, at the instance of Judge Depue and Governor Ludlow. Each one visited Graves separately, not knowing that any other physician would visit or had visited him. The Governor sent four from Mercer County. One of them was Dr. John W. Ward, physician of the Trenton Lunatic Asylum. Dr. Ward visited Graves twice and gave the greatest attention to the case. He used an instrument which, it is stated, enables the operator to look through the eye and see the working and general character of the brain. Graves told him, as he told every one, that he had no memory, that his mind was gone, etc., etc.

"Why, Graves," said the doctor, after he had finished, "there's no reason in the world why you can't remember your mother's name, if you want to. Your brain is in a good condition."

The doctor left the jail perfectly satisfied that Graves was feigning imbecility and unsoundness of mind. He so reported in writing to Governor Ludlow and the Court of Pardons. Similar separate visits were made by three other Trenton physicians of high standing: by Drs. William O'Gorman and S. B. Hunt, of Newark, David S. Smith, of Clinton, and a number of other professional men. All testified that Graves was not an imbecile, but was sane. It has been reported that Dr. O Gorman stated in his letter that Graves was an imbecile. We are informed this is wrong. The doctor said he was bordering on imbecility. When the Court of Pardons finally acted, a few weeks ago, upon Graves' case, it had all these letters before it, *likewise the benefit of the personal visitations of the Governor and Chancellor.* The following is a literal transcript of the minute of the case entered in the official report of the Court of Pardons:

"The application of James B. Graves, of Essex, under sentence of death for murder of the first degree, to commutation of sentence to imprisonment for life was taken up, and the petition and papers in the case were duly considered, and, after mature deliberation thereon, a motion was made and seconded that the application for commutation of sentence be denied. The motion was agreed to by the unanimous vote of the Court."

The writer believes the statement in the above extract, that Graves said he "had no memory," and that his "mind was gone," to be the result of a perversion of Graves' self-reproaches regarding his habits and their effects. He certainly made no such statements when the writer visited him, and was too demented and apathetic to talk even of this dominant subject at the latter time. As the medical report is accessible only in the shape of verbal statements made to newspaper reporters, it might be, perhaps, unjust to infer that the expert based his conclusion that Graves was shamming on the admission of the latter that his "mind was gone," and superfluous to remind him that even a demented prisoner may understand that his defence is insanity, and attempt to support it

perative the duty of exerting this clemency then, when it was so evident that this old man was and had been insane, and would never be otherwise?

I concluded that Graves was passing into terminal or secondary dementia with a senile element, and had not sufficient understanding to appreciate his position, that there was no ground whatever for suspecting simulation, but, on the contrary, that the mental manifestations were so consistent and in such harmony with his physical state that simulation was to be excluded. I embodied these facts in a report to the Governor, and concluded it with the statement that, if the death penalty were to be inflicted on Graves, it would not be executed on the body of one sane and responsible, but on one physically and mentally invalidated.

This report was signed by the physician to the Newark Asylum, Dr. Young, Dr. Lehmacher, and Dr. O'Gorman, the latter of whom had (as related) testified during the progress of the trial. Three other physicians made reports to a similar effect, and all were handed in to the Court of Pardons. The only comment made by Governor Ludlow was the inquiry directed to Mr. Kalisch, whether the gentleman who had prepared the report was the same one who had recently testified that one person in five was insane. Occupying such a position of histori-

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in a clumsy way of his own. The latter supposition, however, in no way applies to Graves.

It may be well to state, as a unit to enable the formation of an estimate of the Court of Pardons, that, while the application in the case of Graves was unanimously denied, the vote to grant a like commutation to a man who had brutally murdered his wife and child was evenly divided, the distinguished chancellor and three judges voting to grant it, while the governor and three other judges voted against it. However, it may be said in their behalf that they correctly represented the popular sentiment, which was indifferent regarding Graves, while the sentimental part of the community made itself heard in numerous petitions on behalf of Martin, and visits of morbidly inclined females to the jail.

cal accuracy,[1] and acting on the assumption that Graves' brain (atrophied, hydrocephalic, and softened, as hereinafter to be detailed) was as sound as his own, it is not to be marvelled that the Court of Pardons, of which Covernor Ludlow was a member, should deny the application of a reprieve, on the ground that the questions involved had been *carefully and conscientiously* investigated.

Hardly had the fact transpired that seven medical gentlemen unanimously pronounced Graves a dement, and the press, particularly of this city, commented adversely on the hasty action of the Court of Pardons, when persons writing in the interest of the Court of Pardons disseminated the report that the genuineness of the seven signatures was "questioned." No more injurious and skilfully calculated imputation could be made, but, as I shall show, it was but a piece of the conduct which characterized the conduct of the discussion by the apologists of Governor Ludlow, his experts, and his Court of Pardons throughout. Mr. Kalisch immediately met the misrepresentation in the columns of the New York *World.*

The rest, gentlemen, you know. How his counsel informed Graves of the destruction of the last hope. How Graves could not be made to understand him. How a last unavailing appeal was made to the Governor, counsel stating that he could neither get Graves to comprehend his situation, nor to recognize how closely he stood on the brink of eternity. You know that the prisoner made irrelevant rejoinders, talked about his wonderful gun, and urged its adoption by the navy, and finally, it must still be fresh in your minds, how he was led by two men, groaning and whining as he had groaned and whined

[1] Such a statement was made by a medical witness, who testified in the Guiteau trial some weeks before the writer was called to the stand, whose name is as dissimilar to the writer's as Governor Ludlow's, and whose domicile is a thousandmiles or so removed from New York.

whenever compelled to walk for the last six months, and how he groaned and whined until the rope shut off all utterance. If ever the hanging of a human being resembled the hanging of a dog, it did so in the case of Graves.

In the afternoon of the same day, a post-mortem examination of the brain and spinal cord was made. Its results were more than usually startling and confirmatory of the theory of dementia.

I exclude from consideration such appearances as atheroma of the blood-vessels, which are common to old age. What I expected to find in conformity with my view of the mental state, was atrophy of the cerebral convolutions, and a much greater atrophy of the convolutions was found than I ventured to anticipate. The sulci gaped widely, there were large pockets of the arachnoid between the gyri, which were filled with serum, there was an enormous amount of serum outside of the brain, and a large amount in the dilated ventricles, so that there was both external and internal hydrocephalus of the compensatory kind. The entire brain and spinal cord were atrophied. The weight of the former was forty-one and one-half ounces, while, from the capacity of the skull, it should have been over fifty. Particularly the posterior horn of the left lateral ventricle was so much dilated that the occipital lobe was reduced to the thinness of a bag on its inner aspect, the tissues were discolored, and a cicatricial induration of the brain-substance found behind it. Other spots of similar induration were found in the opposite occipital lobe and in the left frontal lobe. The existence of these latter signs of organic disease had not been suspected during life. There was a large patch of softening with cretaceous metamorphosis of parts of the softened areas underlying the indurated fields of both occipital lobes. The larger of these was on the left side.

It is scarcely necessary for me to add that, excluding

the signs of destructive brain disease found in Graves, the general atrophy of the brain was far greater than is ordinarily the case in dementia, and as great and of the same character as in extreme cases of that condition. They were sufficiently startling to convert at least one medical gentleman present (and very naturally) from his previously expressed view that Graves had shammed during life.

So much has been said about the misinterpretation to which some of those advocating Graves' sanity saw fit to resort, that in justification of the perhaps harsh terms I have employed, I will cite an editorial from the *Newark Daily Advertiser*, avowedly written by a medical advocate of the Court of Pardons and their experts. This, you may recollect, is the sheet edited by one of the medical experts who reported to Governor Ludlow that Graves was not insane. That there may be no misunderstanding on this head, I will say that the *Newark Daily Advertiser* is not a medical journal[1] though edited by a "medical expert."

"The *Herald* suggests that the trial of Graves is a hard blow at expert testimony, and cites the differences between seven physicians who, it says, insisted that the murderer was sane, and as many others perhaps who said he was a recent imbecile, or for a long time, probably from birth, an insane man. Half of this goes for nothing. The physicians selected by the Court of Pardons were not instructed to report on the question of insanity. There was a fear in the Court of Pardons that the physical condition of Graves was, or would become, such as to make the incidents of his execution offensive to public sentiment and deprive the execution of all its monitory lessons. In that event Judge Depue would have himself laid the case before the Court of Pardons, as we are authoritatively informed. All that was asked of the Government examiners was to report whether Graves was in such bodily health as would make him presentable for the ceremonies in which he was the central figure. What was expected of the examiners was a skilled, expert physical diagnosis, a study of his conditions notably as to the digestive organs, and then render a prognosis or

[1] Issue of January 4th, 1884.

opinion whether Graves could have stamina enough to go through, with no insult to a proper sense of decency.

"It was on this point of physical health that the seven Government examiners were instructed to report, and not as alienists. The plea of insanity was abandoned years ago and had lain dormant, sundry technical rulings being held as of more account. Then he became very sick. Some slight changes in the attendants, the policing of the room, and the handling of the food of the patient, made a sudden cure of that remarkable illness, and the next recourse was to revive the plea of insanity, or call it imbecility. That was considered *res adjudicata*, and the Court of Pardons refused to interfere. The final plea was to the Governor, asking for a reprieve long enough to take the case out of his own responsibility and turn it over to his successor in office, which was neither complimentary to Governor Ludlow nor decent to Governor-elect Abbett. It was, perhaps, excusable, but not justifiable.

"As to the post-mortem examination made yesterday by Dr. Spitzka, no opinion can be formed of its value from the report of it as verbally given to the reporters. The Doctor never wrote or dictated such a mess of gibberish,[1] nor showered such a mass of technicalities on the tortured brain of a reporter. It cannot be translated by any anatomist, however practised and skilful. That does not prove, however, that there is any falsehood in the more intelligible report which will probably be made. But an anatomist of thorough or half-thorough training will see in this miserably muddled report that the appearances in the brain are incident to sudden death from suffocation by gas, drowning, or by congestion of the brain incident to strangulation by a rope. The instant the drop fell, the heart thundered its whole forces upon the brain, and the blood was dammed and choked back by the closure of all the return currents. Except through a full consideration of the methods of death, the instant events of the shock *in articulo mortis*, no fair study of the brain after hanging can be made, unless the death is by breaking the neck so suddenly as to stop the action of the heart in the twinkling of an eye. Then, a post-mortem examination might give reliable results.

"The argument hardly requires an explanation. Why should not the brain, the primary objective in the work of killing, present something like the same conditions as other parts of the body, which it was sought and intended to be preserved in some natural

[1] In one local paper the medical terms, as frequently is the case in the daily journals, were mis-spelled.

seeming? The eyes were turgid, the face, and even the limbs swollen, the skin distended. Why not charge these up as pre-existing evidences of insanity or imbecility? They occurred at the same moment and from the same cause, the sudden diversion of the torrent of the blood from any escape from the brain and its overflow to easier channels to the soft tissues under the skin. Given a force pump, driven by the strongest muscle in the body, its full stroke directed upon a soft organ inclosed in an unyielding case of bone, and it would be a miracle if symptoms as recent as the swelling of the face should not be developed in the brain which is itself incompressible as water when the blood torrent is equable and normal.

"While we do not pretend to translate the incomprehensible report of the autopsy, we find considerable importance attached to certain gritty particles which could be felt by the finger. Taking the general blaze of the track in the neighborhood where the reporter was called in to feel the grit, we suppose that it was in the choroid plexus—pardon us for the technicality, which is in the best style of English Greek--a little knot of small veins which seems to be intended to slow the return current of blood, and through which the blood passes slowly. It is like a snarl of red yarn, and in it are oftentimes found in old age these gritty particles, probably of phosphate of lime, apt to occur there as the debris of a steam- or water-pipe incrustates around a valve, and entirely the same as the bony arteries and veins of old people, in what are called alike the distal or distant arteries or the veins, those farthest away from the stroke of the piston, which men call the heart, and most likely to get foul. These "grits" are of no importance, and are usually passed over by the anatomist.

"We have given some space, but not much time, to the report spread before us this morning. It is not a report which Dr. Spitzka would rest upon as his own, but the fact is that so far as we can translate it, it exhibits a trick in the matter of the 'grits,' which invalidates the general contour or truthful outline of his statements. And it is evident that he attributes to the instant changes produced by the act of hanging, conditions which are logically referable to the method of death, its inevitable mechanical incidents. The same conditions of the brain are caused in the dead body in the microscopical injections made to exhibit what is called general anatomy. They are mechanical and not physiological, and the brain of a man who has suffered death by hanging is a ruin by the rope before it is examined. An anatomist should be also a machinist. He is studying physical forces

and their abnormal action. A crushed arm will not give the anatomy of the same arm before it was crushed."

Whether the interest which questions the integrity of a report before it is made deserves any consideration at my hands, is perhaps not the question of the evening. It may suffice to refer to the fact that the autopsy was conducted in the most public manner, and that no microscopical examination whatever is needed to confirm the view that Graves was a dement.[1] There were over twenty persons present, at least thirteen of Newark's leading physicians were mentioned to me by name, the county physician Dr. Hewlett, the asylum physician Dr. Young, the jail physician Dr. Kornemann, and others. There was also present the assistant public prosecutor. The changes I have above referred to were confirmed by each one present individually, and by a member of this Society who accompanied me.[2]

The execution of Graves is the least creditable outcome of the reaction against the insanity plea in criminal cases. It constitutes, not a vindication of the majesty of the law, but of the vindictiveness of certain of its interpreters, the brutality of public opinion, and the unreliability of "expert" testimony. Let it be borne in mind that it is loudly urged in certain quarters that the regrettable features of our present expert system are due to the selection of the expert by partisans, and the moulding of his views to serve the interests of his employers. It is loudly proclaimed that as soon

[1] Induration of all cortical tissues, of the pons and medulla oblongata, intense pigmentation of all the larger ganglionic cells, atrophy of some, evidences of dehiscence in the nuclei of the pons and oblongata; reduction in thickness of the cortex, obliteration of the layer demarcation in the recent and hardened specimen, "shrinkage atrophy" of ganglionic elements, reduction in their number, extreme pigmentary degeneration, minute cortical cysts. No evidences of cortical structure in the thinned out portion bordering on the inner face of the posterior horn. In the recent state, this area was greenish in color, and so firm that one of the numerous witnesses, who examined it on the occasion of the autopsy, characterized it as cartilaginous, and very correctly.

[2] Dr. Francis A. McGuire.

as the expert is appointed by a governor, a governmental commission, or a court, he will become an independent interpreter of scientific truths, testifying without fear or favor. In the Graves case, those making this proclamation had an opportunity of seeing their proposed plan tested. The court and the governor appointed experts to test the mental state of Graves. Whether Governor Ludlow also *instructed* his experts or not, is not a question that can well be considered now, and if it were so, it would not alter the fact that the most disgraceful exhibition of incompetent expert testimony was made under the sanction of a governmental appointment.[1]

When we bear in mind that in this instance an expert commission appointed by a court and a governor, confronted with the post-mortem confirmation of an opinion opposed to their own, saw fit to avoid an honest confession of error, by alleging that extreme atrophy of the brain, external and internal hydrocephalus, old cicatrices of a year's standing, extensive and extreme degeneration of the cortex and white substance of the occipital lobe were produced by the hanging,[2] and were not the results of previous disease, we are forced to the inevitable conclusion that a governmental appointment of an expert does not afford

[1] It may be recollected that the prosecutors of Guiteau first employed the Superintendent of the Government Asylum at Washington to examine the mental state of the assassin. Dr. Godding, however, not being prepared to testify that Guiteau was sane, other experts more accommodating in their views were sought for, found, and selected.

[2] See extract from the newspaper editorial above cited. That the authorities were determined to discredit by every means, fair or foul, the deliberate opinion given by physicians of the highest standing in Newark, several of whom had sacrificed their pride of opinion in admitting a previous error, is shown by the appointment on the sheriff's jury (which witnessed the hanging) of a "foreman," who, in the treble capacity of a lay juror, a brakeman of the Pennsylvania Railroad, and an expert in insanity, vented his indignation at the "insanity dodge" in illiterate and vulgar terms, with the victim of a judicial strangulation at his feet, and was encouraged to do so in an interview published in the single metropolitan journal which did not declaim against the cruelty of the execution.

any guarantee of the reliability of his opinion. It may be honest, but as misleading and detrimental to the purposes of justice as the most biassed testimony of a witness employed in partisan interests.

DISCUSSION OF THE GRAVES' CASE.

DR. C. YOUNG :[1] I did not expect to be called upon, and trust that the members of this Society will pardon whatever imperfections in my remarks may be due to the fact that they are made without any preparation. I certainly agree with the reader of the paper that Graves was demented, and was one of those who so reported to the Governor. I can also confirm the statements about the post-mortem appearances, which were of so pronounced a character that they surprised many of us. I think that, in criticising the editorial written by one of the medical gentlemen who differed from us, Dr. Spitzka was not aware that there was published in another journal a report of the autopsy, in which the technical terms were terribly distorted, and which contained numerous absurd statements. I am certain Dr. Spitzka would have repudiated this report had he known of its existence, and the "expert editor" to whom he refers was correct in some of his strictures. That he was guilty of still greater fallacies himself is evident from his statements about shrinkage of the brain being produced by hanging.

SAMUEL KALISCH, ESQ. : Not expecting to be called upon to make any remarks, I will endeavor, to the best of my ability, and as far as want of preparation will permit, to comply with your request by giving you the legal history of the case of James B. Graves. The able and lucid disquisition on Graves' mental state by Prof. Spitzka can leave no room for doubt that Graves was an imbecile, and in an irresponsible state at the time he was executed. A little over two years ago, James B. Graves, in a crowded thoroughfare in the city of Newark, stealthily stole up behind Edward Soden, a lad fourteen years of age, and shot him dead. He made no effort to escape, but quietly permitted himself to be arrested He was indicted for murder of the first degree. At the time of the commission of the deed Graves was sixty-eight years of age He was a forlorn specimen of humanity, without money or friends Abner Kalisch volunteered his services in behalf of the accused, and after having had several interviews with his wretched client

[1] Physician-in-Chief to the Newark (County) Asylum.

became convinced that Graves was demented. Accordingly, upon the trial of the accused, insanity was the defence. The want of an adequate motive, the horrible atrocity of the act, the degrading vice of self-pollution to which the defendant had been addicted since he was thirteen years of age, together with many irrational acts which he committed prior to the killing, were relied upon to establish his irresponsibility. Being too poor to employ doctors or experts, his counsel was encountered with difficulties from the outset. Another and equally formidable obstacle lay in the fact that just at that time the Guiteau trial was progressing in Washington, and a popular reaction had taken place against the plea of insanity. Notwithstanding the testimony of Drs. O'Gorman and Hewlett on behalf of the prosecution that the defendant was weak-minded, and that certain hypothetical questions put to them by defendant's counsel, embracing the acts of Graves, illustrated the actions of an insane man, Graves was convicted and sentenced to be executed. On the trial the court was requested by the defence to charge the jury that, if the jury had a reasonable doubt as to whether the prisoner was sane or insane at the time he committed the act, they ought to acquit him, which the Court declined to do; but, on the other hand, charged the jury that the accused was bound to prove his insanity by a clear preponderance of proof. Exceptions were taken to the charge, and the case was appealed. At this juncture my connection with the case began. When the case came on appeal before the Supreme Court, it was contended on behalf of the prisoner that the rule which was laid down by Chief Justice Hornblower in the Spencer case over thirty years ago, which required the accused to prove his insanity beyond a reasonable doubt, was not only inhuman and barbarous, but was false in law and in principle. That according to Lord Coke, Sir Wm. Blackstone, and other eminent authorities, only persons of sound mind were capable of committing crimes; that, while the law presumed every person to be of sound mind, this was an assumption based on the normal condition of man, an inference drawn from an inference that all men are sane. Without stopping to discuss what effect the legal presumption of innocence would have in countervailing this vague assumption, it is at least to be expected that, when the assumption is atttacked by a circumstance or the testimony of a single witness, the assumption of sanity is completely overthrown, and then the burden rests with the prosecution to show that the prisoner was of sound mind. In short, the assumption of sanity stands until it is attacked, but, as soon as attacked, the State alleging sanity must prove it beyond a reason-

able doubt. In all other criminal prosecutions the defendant is entitled to the benefit of a reasonable doubt. The strong lusty prisoner who admits the killing, but says he committed it in self-defence, receives the benefit of a reasonable doubt. The poor, miserable, diseased in mind and body criminal, upon whom the hand of God has placed the greatest affliction that can curse mankind, is not entitled to the benefit of a reasonable doubt, although he is in the most need of it. If a jury has doubts of the sanity of a person charged with murder, do they not at the same time doubt the premeditation, deliberation, wilfulness, etc., with which the crime must be committed? New York State was the first to take the progressive step in discarding the barbarous rule of Ch. J. Hornblower's, and adopt not only the more humane one, but a rule which is based upon sound reason and founded in true principle; that where the defense is insanity the defendant is entitled to the benefit of a reasonable doubt. In Brotherton vs. People, 75 New York, and O'Connell vs. People, 87 New York, the rule is forcibly illustrated and maintained. In nearly every State where the question has been raised they have followed in the New York rule, so that we find New Hampshire, Indiana, Illinois, Alabama, Kansas, Michigan, and other States in line with New York and with civilization. After long argument by able counsel, the New York rule was adopted in the Guiteau case. Eminent law writers like Wharton, Bishop, Pomeroy, and Desty proclaim the New York rule to be the one sound in reason and true in principle. The Supreme Court of New Jersey, however, was afraid to disturb the mouldy theories of their predecessors, and so the Graves case was decided adversely to him, on the ground that the barbarous law had existed for thirty years, and therefore ought not to be disturbed. From this decision an appeal was taken to the Court of Errors and Appeals of New Jersey, when the Chancellor, who is the presiding judge, delivered the opinion of the court, changing the Hornblower rule which was followed by the trial judge in his charge, and adopted a rule which will be productive of the utmost confusion and grossest injustice in insanity cases. This court, being struck by the barbarity of the Hornblower doctrine, laid down the rule, that in insanity cases the defendant must prove his insanity by a preponderance of proof to the satisfaction of the jury. They affirmed the judgment of the Supreme Court and the court which tried Graves, although they admitted that the rule as laid down by the trial judge was too harsh, and therefore changed it. Two judges, Magie and Patterson, voted to reverse the judgment. The

absurdity of the rule adopted by the Court of Errors is amply demonstrated by a very able article on the plea of insanity in criminal cases by Prof. Ordronaux, published in one of the numbers of the Criminal Law Magazine. It is true, as Prof. Ordronaux states in his learned article, that if preponderance of proof is to be the test of a man's sanity or insanity, the longest purse will have the advantage. The confusion also which such a rule provokes is to be found in weighing the expertness of the experts by a jury. Absurd rules are worse than cruel and inhuman ones, for under the former you never know what to expect, while under the latter their certainty relieves them somewhat of harshness. A year and a half elapsed before the final result in the case was obtained. In the mean time Graves had been so desperately ill that his life was despaired of, and his illness left him a physical and mental wreck. When brought into court to be resentenced he was so weak that he could not stand without the assistance rendered him by two constables who supported him, while he apparently listened to his doom. He did not recognize his counsel, nor did he realize his fate. When it became painfully evident that it was the ardent desire of the authorities to hang this demented creature, strenuous efforts were made to have his sentence commuted. As I stated before, the doomed man being totally destitute of everything, the burden was thrown on the charitably inclined to protect humanity from barbarity. A petition, duly verified, was filed in the court where Graves was tried, convicted, and sentenced, setting out the fact that since Graves' conviction and sentence, he, Graves, had become an imbecile and was not a fit subject to be executed, and praying that his mental condition may be inquired into by a jury. For the common law, although bristling with cruel and barbarous punishments, has since the days of Lord Coke, held high in reverence, that no man while insane shall be arraigned for trial, and if he become insane after trial, he shall not be convicted, and if he become insane after conviction he shall not be punished because the execution of an insane man cannot afford an example to evil-doers, but would be a shocking and inhuman spectacle. And this we find laid down as the common law by Hale, Hawkens, Blackstone, Russell and Chitty, followed by our more modern authors, Wharton, Bishop, Archbold with Pomeroy's notes, and others. Numerous decisions in various States recognize and reaffirm the common law doctrine. In New Jersey, which adheres to everything which is ancient, and where the common law is in force, so that even Lord Coleridge remarked it on his visit to this country, would be expected to follow this singularly good and laudable relic of an-

tiquity. In this I was again mistaken. The judge refused to grant the prayer of the petition, upon the ground that it was not within the power of the court to do so. This refusal on the part of the court was in direct opposition to what was conceded to be the prisoner's right at common law, by the able opinion of Judge Edwards, of New York, in his celebrated controversy with Governor De Witt Clinton, in 1828, reported in 9 Cowan, and by the opinion of the court in Freeman vs. the People, 3, Denio Report. In New York State there is a legislative act which confirms the common law that no insane person shall be punished. After the refusal of the court to inquire into the mental state of the prisoner, the only thing to do was to appeal to the clemency of the board of pardons. With that object in view physicians, who had previously examined Graves and pronounced him weak-minded but sane, re-examined him and pronounced him insane. Prof. Spitzka and well-known physicians of Newark were also requested to make an examination, which they did and pronounced Graves insane. Armed with seven certificates certifying to Graves' insanity, we proceeded to Trenton and handed them to the governor, but to no avail. From the governor we did not expect any mercy, but we did expect the exercise of humanity. The court of pardons refused to interfere, although Chief Justice Beasley, who stands second to none in the country as a lawyer and jurist, actively interfered in behalf of a commutation of sentence, and the New Jersey authorities exemplified the strong arm of the law by hanging an imbecile. This was not the first time that an insane man was hung in New Jersey. Patrick Maud, who escaped from an insane asylum, killed his sister while stark mad, was condemned and executed while he was in that condition. An autopsy revealed a tumor in his brain. I can assure you that when the legislature of New Jersey assembles, they will be asked to pass a law which will prevent such horrible and revolting exhibitions and demoralizing influences in New Jersey. (Applause.)

MR. C. H. KITCHELL: The logical basis upon which all penal statutes rest, the only ground upon which they can be justified or defended, is this—their necessity for the protection of society. Vindictiveness should never prompt the passage of penal laws or enter into their administration; insofar as it does, it defeats their purpose, and injures society, that should be protected, as well as the criminal who receives the punishment.

Society is much more to blame for the violation of its laws than society is willing to admit. The case under discussion this evening is a fair illustration of this fact. If this man Graves had been

properly educated, he would not have fallen a victim to the degrading vice that weakened his intellect, and eventually drove him into insanity and crime. Society often neglects its duty to the citizen, and then punishes him for the violation of its laws, which is the logical result of this very neglect. We permit rum shops, gambling houses, and houses of prostitution to exist, almost unchecked, in the very centres of our civilization, and when the weak and unwary, through these avenues to hell, are led to violate those laws, obedience to which is the only safety of the State, we punish them. In this city of abundant wealth, society carelessly, I might say cruelly, permits more than one-half of its population to be packed (like herrings in a box) into tenement houses where even the common decencies of life are impossible, and then punish them for the crimes that almost of necessity grow out of such surroundings. Such treatment, if not so infinitely sad, would be ludicrous. These instances will sufficiently illustrate the responsibility of society for many of the evils and much of the crime that curses and pollutes it. There is every reason, therefore, why society, in dealing with its criminal classes, should do so with tenderness, wisdom, and the greatest humanity.

Penal laws seek in four ways to protect society from the acts of the criminal :

1st. Through fear of punishment to deter from the commission of crime.

2d. By the reformation or the criminal.

3d. By the entire exclusion of the criminal from society for shorter or longer periods.

4th. The removal of the criminal by death.

Until within less than a century, in this and every country fear of punishment was the chief, I might almost say the only, thing relied upon by the law to prevent the commission of crime. It was this spirit that prompted the enactment of the laws and governed in their administration and execution. This, I think, will be admitted by every student of penology. Vindictiveness seemed also to inspire to no little extent the decisions of courts and the findings of juries, and the result—almost the necessary result—of which was, that when the criminal had fulfilled the term of his punishment, he was again let loose upon society, all his criminal instincts intensified, tenfold more the child of hell than before, until the State shrank back affrighted and aghast at the flood of crime and corruption that was being yearly poured into its quivering bosom, and in self-defence was obliged to study the question more intelligently, and be governed by wiser counsels.

I believe that fear of punishment very seldom deters from the commission of crime, and, if this be true, exclusion of the criminal gives as great protection to society as can be obtained through human enactments, and the death penalty is little less than murder under the forms of law.

I would go even further than this. I believe it would not be difficult to show that both theoretically and practically the death penalty leads to the commission of the very crime it is intended to suppress.

There is another principle that—every jurist will admit—should govern in the administration of criminal law, viz., that no one should be punished for the violation of a law when morally irresponsible for his acts; and whatever differences of opinion there may be as to when a man is morally irresponsible, there will be no question that he is so when insane.

This question as to the percentage of the insane among the criminal classes, within the past few years, has had great consideration, and such percentage is much larger than people generally suppose. To show how large it is (or how large those believe it to be who have given serious study to the question), I make but a single quotation from one whose wide experience should entitle his opinion to great weight. Dr. Guy, Secretary of the London Statistical Society, and physician to Millbank prison, states, based upon a tabulated statement covering thirty years : "The criminal population contains a much larger proportion of insane members than the community at large, and" (in 1869) "in the Millbank prison upwards of two hundred convicts" (average being about eleven hundred) "were so unsound of mind as to be deemed fit occupants of special wards, and yet deemed not quite fit for the lunatic asylum."

I submit, therefore, both upon grounds of sound reason as well as of humanity, that in every case, especially so when a man is on trial for his life, the defence of insanity is not only proper, but should receive every consideration from court and jury, rather than be looked upon with discredit, that every opportunity should be given for the most thoroughly investigation, and that the prisoner should have the benefit of every doubt.

If the prisoner is insane, is not society perfectly protected by his incarceration in an asylum? What justification, then, has court or jury for hanging him? Will the hanging of an insane man deter others from becoming insane? Will it deter sane men from committing the crime? Courts and juries should not forget that all reparation for error is passed when the victim has expiated his

supposed crime upon the gallows. That conservate spirit that leads us to glory in the past may, to some extent, be commendable, but it is not greater than justice, nor nobler than humanity. The harshness, the cruelty, the inhumanity of the early English criminal law (from which ours is taken) should bring to our cheek the blush of shame, rather than the exultation of pride. The more carefully its history is studied, the more deeply will the conviction grow upon us that the law, in its slow and cautious policy, lags far behind the progress of true knowledge. (Applause.)

DR. L. C. GRAY: I do not know anything more about the Graves case than what may be gleaned from the newspapers, and the latter are not usually so infallible as to make me feel especially well-informed. But if, as Dr. Spitzka claims, Graves was insane, his execution was certainly a blot upon New Jersey. But nothing in the way of verdicts concerning insanity cases can possibly surprise me, because some little experience in insanity trials has taught me how difficult it is to imbue the minds of jurymen, lawyers, and judges with the insanity of any individual who is not so insane that any tyro can detect the insanity. Let a man's mental aberration be such that he will run amuck through a court-room, and then judges, lawyers, and jurymen will become believers, unless the lawyer on the other side, or some juryman who prides himself on his shrewdness, suggests that this is shamming. But of the more delicate and infinitely more dangerous forms of insanity, those which are therefore the most apt to bring a man into conflict with the law, the average lawyer, judge, or juryman have little or no conception. They lack a knowledge of the very elements of the science of psychiatry. Moreover, they are not mentally in a receptive state, as students learning the elements should be. Yet before these gentlemen, utterly ignorant, come gentlemen versed in mental medicine, who are devoting their life to their specialty; and the ignorant sit in judgment on the learned. The well-informed specialist is not distinguished from the spurious one. The newspapers, eager for sensation and popularity, hound the Court on in one direction or the other. What wonder is it, then, that insanity trials are usually farces?

In answer to a question from the President, Dr. Gray stated: In diagnosing a case of insanity, I would place much more reliance upon the symptoms that were observed during life by a competent observer than upon anything to be found in the brain post-mortem. With the exception of one or two forms of insanity, the textural changes in the brains of the insane could not be detected by our present instruments or with our present means of

preparation. That there are changes in all cases I cannot doubt, for I cannot conceive of disease without a material basis; but their precise nature is not always known. To prepare a brain for microscopic examination is a thing that can be done only after special preparation, and the men in this country who can do it may be numbered on the fingers of one's two hands; and it may, therefore, often happen that even palpable changes are overlooked. As I came too late to hear the paper, and am, therefore, not acquainted with Dr. Spitzka's findings, I am unable to say anything about their bearing.

Ex-Judge AMOS G. HULL, after saying that he had not expected to be requested to make any remarks upon the paper of the evening, and would hence say but a few words, spoke as follows: The paper is a public benefaction. It will arouse attention whenever read and will be productive of lasting benefits to the cause of humanity. The facts given in the course of the discussion by Mr. Kalisch, the learned counsel who defended the insane homicide (the miserable specimen of humanity Graves) would seem at first impression to cast censure upon the administration of justice in New Jersey. The argument of the learned counsellor, that the rule of evidence in capital cases where the plea of insanity in interposed, should be in New Jersey and in all the States that if the jury have any doubt of the sanity of the prisoner, he should have the benefit of the doubt, even if convinced that he committed the homicide, was very ingenious and interesting.

The remarks upon the rigor of New Jersey justice must be taken with some degree of allowance. The fact that Judge Depue, before whom the homicide was tried, went before Governor Ludlow and urgently sought the pardon of the condemned idiot, shows that the judicary of that State are not deficient in the qualities of mercy. I know Judge Depue, and have tried causes before him, and know that a more learned, upright, and humane man than he does not adorn the bench of any State. New Jersey justice, it is said, has a *terror* for the criminal classes. It is a great benefit to that commonwealth that it has established such a reputation. The people of that State, however, are as kind and merciful and intelligent and humane as the people of any State in the Union. But it must be remembered that New Jersey, once called "Nova Cesarea," was populated at first by that noble race that came from the Netherlands. That people had great respect for judicial and ecclesiastical authority. Perhaps, like the Puritans, they had too much respect for the latter. Men are governed more by authority than by reason. Both have their advantages and abuses.

Too much authority results in despotism. Reason must be guided by the highest degree of virtue, morals, and intelligence, or it will degenerate into anarchy, as it did in France.

But Mr. Kitchell, the speaker who has preceded me, has struck the key-note to this whole matter, when he says that we must instruct the people to be governed by reason more than by mere technical rules, and thereby prevent such a disgrace to jurisprudence as occurred in the hanging of the disgusting idiot Graves.

In conclusion, permit me to say that it is just such learned, valuable, and instructive papers as that read by Dr. Spitzka tonight which tend to bring about a result so desirable.

The discussion was closed by DR. E. C. SPITZKA, who said: I must in the first place thank the individual speakers for their lavish encomiums, and the audience for their patient attention. There is but little in the interesting discussion which requires special comment in connection with the subject of the paper, as but little that has been said has approached the nature of controversy. Dr. Young refers to an apparent injustice done the medical editor of the *Newark Journal* whose article I cited. I owed to Dr. Young's previous courtesy the information which the Society received from him this evening as to the mutilated and garbled report which was made of the autopsy in another periodical, and incorporated the information in a foot-note, which I omitted to read. However, this does not alter the fact that the editorial in question was directly calculated to deceive, as Dr. Young, I believe, has pointed out.

With regard to the reliability of post-mortem evidences of insanity, I entertain opinions very similar to those expressed by Dr. L. C. Gray, and, in fact, have formulated them in a paper read two years ago before the whilom New York Medico-Legal Society in nearly the same terms he has used this evening. I consider terminal dementia, the form of insanity from which Graves suffered, to be one of those conditions which are very apt to be associated with organic brain changes.

The thanks of the Society were then, by motion, tendered to the reader for his able paper.

The annual report of the Treasurer then engaged the Society's attention. It was moved, seconded, and carried that the report be accepted and referred to the Board of Trustees. The Financial Secretary's report was then read, and, by motion, accepted, and ordered to be placed on file. The annual report of the Board of Trustees was then read, when it was moved, seconded, and carried that it be accepted and placed on file. The Financial

Secretary then reported a donation of $50.00 from the President of the Society, and moved that the thanks of the Society be tendered to Mr. Barnes for his generous gift; seconded, and unanimously carried.

In connection with the discussion as to the necessity of filing the Trustees' report in the County Clerk's office, it was moved and seconded that Mr. Eller investigate the subject and report; amended that the matter be referred to the present Board of Trustees with power; seconded, and amended motion carried.

The Society then, on motion, adjourned.

Twelfth Regular Meeting, February 14th, 1884.

The twelfth regular meeting of the Society was held at the usual time and place on Thursday evening, February 14th, 1884, the President occupying the chair. The minutes of the preceding meeting were adopted as read. The report of the Board of Trustees was accepted. They recommended that the distribution of the "Transactions" be intrusted to the Committee on Publication instead of the Financial Secretary; they reported the election of Dr. Wm. M. McLaury to the vacancy in their body caused by the resignation of Dr. Leale, and recommended for election to active membership Samuel Kalisch, Esq., of the Newark Bar, and announced that the regular meetings of the Board in future would take place on the second Mondays preceding the regular meetings of the Society. They therefore reported the next meeting of their body to take place at the residence of Dr. E. C. Spitzka, 137 E. 50th street, on March 3d, at eight o'clock.

The Committee on Publication of the Transactions of the Society reported through Dr. Spitzka the desirability of adding to the transactions a list of the members of the Society.

Mr. Samuel Kalisch was then unanimously elected an active member of the Society.

The paper of the evening, entitled "A Plea for the Just Treatment of Criminals," was then read by Prof. Jarvis S. Wight.

Too much authority results in despotism. Reason must be guided by the highest degree of virtue, morals, and intelligence, or it will degenerate into anarchy, as it did in France.

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A PLEA FOR THE TREATMENT OF CRIMINALS.

BY

J. S. WIGHT, M.D.,

Professor Operative and Clinical Surgery at the Long Island College Hospital.

A sick man once sent for a physician, who went promptly, and found the patient very ill. The sick man asked the physician if he had delayed too long in sending for him. Yes, replied the physician; you have delayed a long time; you ought to have sent for me sooner. Truly, you ought to have sent for me when your gradfather was a young man. You began to get sick at a time when your grandfather became afflicted with an incurable malady.

A child of the desert had been very wicked; he had told many lies, he had stolen many horses, and he had committed many murders. He chanced to meet an Arab philosopher, whom he asked to intercede for him, because he was under the anger of God on account of his many crimes. The Arab philosopher then devoutly repeated to the God of the faithful the following prayer, namely: *O God, be kind to the wicked, for Thou hast been sufficiently kind already to the good in making them good.*

Once on a time, the good Shepherd had an hundred sheep. He kept them sheltered from the wind and storm, and fed them plentifully, and gave them fresh water to drink. One of the hundred sheep went astray, and was lost in the wilderness. The shepherd left the ninety-nine sheep, and sought the one that was lost, and did not rest

till he found him astray, and brought him back with a glad heart.

I once saw a man in the time when life should be at its prime. He had lost his mind, or, at least, the greater part of it; he abandoned his business; he neglected his person; he no longer had any affection for his family; he had threatened to take the lives of those who had been nearest and dearest to him. Well, this poor man had been infected with a certain disease when he was in his youth, and that disease had invaded the nerve-cells of his brain, and robbed them of the power to think, will, and act, so that what he could have wished to do he neither did nor could do. And it was kind and merciful that he died. And the autopsy revealed the written testimony of the disturbing factors that had worked ruin to the construction of his brain.

A man of middle age was found in one of our parks. He still held a pistol in his right hand; there was a bullet hole through the right side of his skull into his brain; the blood was yet slowly oozing, and the poor fellow was unconscious. It was discovered that he was an insane suicide, whose troubles were greater than he could bear, and who had drawn the veil of oblivion before his mental horizon by his own right hand. I removed the bullet from this patient's brain, and tried to keep him alive, but the disturbing factors were greater than the consistency of his organization. His physical system was dissolved into its original elements. An autopsy exhibited the facts that the membranes of his brain had long been in a state of inflammation, and that the nerve-cells, enabling him to think, will, and act, had been irreparably damaged.

Our standard of comparison is not the man who fell sick on account of the errors of his grandfather, nor the wicked son of the desert, nor the defenceless sheep astray, nor the

man who had broken the commandment in his youth, nor the suicide who had drawn the veil of oblivion before his own mental vision, but it is a man who has a good *heredity*, whose blood has been of prime quality, and has been flowing for generations in sound arteries, capillaries, and veins, whose brain, through its complex cells, thinks, wills, and acts well, because all the avenues that have led up to its complete organization have been accurately surveyed and properly constructed, whose nutrition has permitted the molecular elements of his various organs to rise to their complete co-ordination, and fall into their normal disintegration, who has had no gall-stones and no stones in his bladder, whose members and whose stomach have carried on a harmonious and profitable co-partnership, whose ancestors have not been sick, drunk, nor epileptic, and have not gone mad, insane, nor criminal.

Well, the man who does not get sick does not need a physician. The man who does not fall drunk does not need a keeper. The man who does not become insane does not need an asylum, and the man who does not go criminal does not need a prison. The sick man used to be treated by the sound of a beaten drum. The inebriate was handled with inhumanity. The insane were once chained in cages like wild beasts, and not so long ago as we might suppose. Criminals are incarcerated and *punished.*

We might as well ask ourselves at once, *What is punishment?* And then we might try to give, if we can, an honest answer, and perhaps our answer might be the one that is true. A careful formula will no doubt help to explain the word and let in some light on the fact of punishment. Punishment was pœna or ποινή, and meant *money paid as a compensation for murder.* That is, if a man had taken the life of another, he paid money to compensate for that life. Indeed, the compensation was for the loss sustained, for

an offence against the law, in a word, for a *crime*. Now, it might happen that, if a man had stolen a sum of money, he might make restitution, and then there would be compensation for a theft. But if a thief could not make restitution, he might go to work and earn money enough to compensate the one he had robbed. Well, in a case of murder it would be very difficult to compensate either friends or society, for the one who has been murdered has passed beyond the sphere of compensation. There could be no compensation for the life of our story-telling president who had emancipated the slave and saved the life of the great republic. Nothing could pay for the life of another lamented president, whose blood was shed by the bullet of another assassin. Shall we say, in view of the supposed legal compensation for these two monstrous crimes, *so let it be to all insane criminals who raise their hands against human life?* Is the payment to be made by the the hangman's rope?

Does a man fall sick, why we try to cure him, but to *cure* means simply to *care* for him. He may have an incurable malady, and then we cannot cure him. A man may be crippled with an incurable lameness, and then he will need a crutch, and even then he cannot walk with ease or grace. A small boy may have disease of the spine. There follow deformation and impaired function. He suffers greatly on account of his misfortunes. We give him supports and braces as remedies for his ills. A man who has always been kind, benevolent, and moral has a tumor develop in his cerebellum, and he becomes a criminal monster. If he murders some one he is hung, if he commits rape he is lynched, and it is with difficulty that the doctor can get permission to examine his body after he is dead. What has a doctor to do with a man who is possessed of the devil? If a man is lame in his leg, send for a bone-setter; if he is lame in his brain, send for the hang-

man. The man's ancestor may have had a lame leg or a lame brain, or he may have had an accident happen to his leg or his brain. The usual practice is all the same.

In this place let us meet the question of a moral sense fairly. Is there such a thing as a moral sense? Yes, certainly there is a moral sense. When a man is just born he has two eyes, but he can't see; he is ready to begin to see. He is not born with the sense of seeing, but he is born with the nerve apparatus that contains the elements in which the sense of seeing is consummated. And when a man is just born he has a brain, but he can't think; he is ready to begin to receive impressions; he is not born with reason, but he is born with the nerve apparatus that contains the elements in which the power of the reason is consummated. And when a man is just born he has the various parts of his nervous system, but he has not as yet any conscience. He will in time begin to cognize impressions and principles, he will become *conscious* of facts and their relations and laws, the various faculties of his nervous system will be conscious, that is, they will, as it were, *know together* what is going on in the world of thought and what is going on outside of this world. At any rate, there will be consciousness to a limited extent. And one of the most consummate results of this consciousness, this knowing together of our faculties, consists in the discrimination of the qualities of actions. Now, we call this faculty of judging of the quality of an action *the moral sense.* And if a man was not born with the sense of seeing, and was not born with the power of reason, he certainly is not born with *the moral sense.* The moral sense evolves in due time.

Now if a man is getting ready to go insane, one of the first things to be noted is the impairment of his moral sense; he may discriminate well in other respects, but when he comes to consider the relations of the

morality of his actions, he shows incapacity, weakness, and indiscretion. In such a case the moral judgment is impaired. It need not be supposed that any particular part of the nervous system is the seat of the moral sense; for instance, this sense has no cortical centre. But it may be admitted that a serious disturbance in a part or all of the brain may bring about an impairment of the moral sense; and we need not illustrate this proposition by examples. And it may also be admitted that the moral sense of a man who goes insane may have been well-developed; he has been a useful, responsible, and well-behaved member of society, having for some reason lost the results of his moral development; insofar he is unsound, that is, he is insane, and is no doubt entitled to our pity, our sympathy, and our aid.

Suppose, now, that this man had never had a moral sense developed, that he had never become *conscious* of the morality of an action, good or bad; this may be due to the defective nervous system that he has inherited, or it may be due to the defective education that he has received. Of course, he could not judge of the moral qualities of actions, not even his own actions.

In what does the man who has lost his moral sense differ from the man who never had a moral sense? Let us see. A man who loves his wife and children, who does good to others as he would that they should do to him, whose patriotism would lead him in the defence of his home and country into the death-dealing hail of war's conflict, cannot at times stand against the temptations of inebriety; behold the change! He who was once so loving, gentle, kind, and brave, has become a monster, whose hand sheds the blood of those he loves. Is there anything that this man can do that will compensate for his deed? Can he pay for what he has done with his life? Again, a man who never loved anybody, who never did anybody any

good, who never knew the nature of patriotism, whose deeds were all diabolical, goes, under cover of the darkness of night, into the presence of one whom sleep has deprived of consciousness and self-defence, and with uplifted hand takes away an innocent life, and goes away blood-stained to be tracked by the officers of the law and brought to bar of *human* justice; and while he carried away from the victim a few miserable dollars, we may still ask why did he do this deed? My answer is: God only knows. Yet we may speculate in the following line: The progenitors of this man had deformed heads; the brain was deficient in some part, more especially the anterior part; they had been evironed by those who habitually commit crimes; they had been educated in the school of misdeeds. And just as surely as the acorn will grow an oak, if it grows at all, will the embryo of this man, out of the mysterious elements of its organization, grow a criminal. And this criminal will be in the manacles and fetters of his hereditary organization. He is, to be sure, born innocent and innoxious, but then he is the offspring of his ancestors, and their crimes culminate in him. He had no voice in the selection of his father and his mother; he was in no wise consulted. His ancestors did not transmit to him a moral nature. If a man has no patrimony, it is not his fault. If a man is color-blind, we do not expect him to appreciate colors; and if a man is morally blind, how could we expect him to appreciate the qualities of actions, as to whether they are good or bad? Again, to go back to the inebriate, who, in an unfortunate time, has done an abhorrent deed; well, he, too, is the victim of heredity, that is, he is, as it were, bound hand and foot at moments, whose fruition sends its roots back for generations into the mysterious disturbance of the nervous system. This man had no voice in choosing and directing the habits of his ancestors. While he was yet to be, some one else laid the foundation

of the derangement and the purpose culminating in his terrible criminality. Now, if my premises are true, and if my reasoning is sound, how shall we escape the conclusion, *that the man who has lost his moral sense does not differ from the man that never had a moral sense?* Indeed, perhaps, the only difficulty we have to encounter is to decide who has the least, or the most moral sense.

But at this point we are met by what appears to be a grave objection; says the objector, *a man may be the father of several children, some of them having unusual talent, some of them being idiotic, and some of them being the worst of criminals.* This is at once admitted; and we are glad to reply to the objector, *that the human fig-tree may be engrafted with thorns and thistles.* At one time a fig ripens and falls; at another time the thorns grow out; and at another time the thistle-seeds are scattered to the four winds. A man may have exhausted his virility during his early manhood, and then beget sons who go mad and fall into incurable insanity; and he may still retain an intellect of remarkable power. A man may have had now and then an insane or a criminal ancestor, for, by a simple law of divergence, every man's ancestors, as we go back from him in time, are more numerous. One ancestor is propagated in an insane offspring, another ancestor is propagated in a daughter that is idiotic, and another ancestor is propagated in a son who murders his friend.

The concurrent and unanimous testimony of those who are, from their experience and their knowledge, most competent to judge is: That the great under class of criminals have more or less defective organizations, especially as relates to their nervous system, and more especially as relates to their brain; that they are more or less deficient in moral sense, showing in this respect the lack of development or the results of decay, the best and last-developed sense, the moral sense, disintegrating first of all; that

they are perversely wicked and indomitably inexpedient, committing crimes when doing right would be of more use to them; that they are as passionate as the wild beasts of the forests, and as restless as the ocean that heaves at every gust of the wind; that they are at war with mankind and ever in commotion with themselves; that they are, like the ship, beaten about by the storm—the ship without compass, rudder, or captain; that they are formed and fashioned by the hand of an evil genius, whose name is bad heredity, and whose hand-maid is ignorance; and that they cannot be very much *reformed*, and that their *reformation ought to have been begun in their ancestors.*

It would seem as if an indictment was being made, when I am making a plea in regard to the treatment of criminals. If the upright and conscientious attorney can make a plea for the individual criminal, then, gentlemen, permit me to make a plea on the merits of the case for the criminal class; and if an indictment of the society in which criminals live should be heard in the shadow of my words, or be read between the lines, yet must I persist in my plea; and the judge who expounds the law, and the lawyer who pleads for or against the criminal, and the physician who studies his physical and mental condition, ought to listen with intelligent respect to words that plead for the wise consideration and the just treatment of the most miserable of men.

It is, let me remark, one of the advancements of modern medicine that it is beginning to teach us how to *prevent* disease. How much distress does not now come into the world! And how much the sum of human happiness is augmented they only know who have comprehended the mission of preventive medicine. And it is now beginning to dawn on the minds of men that the greatest need of all in the treatment of criminals is to apply the principles of the *prevention of crime.* Is it not wise, right, and just after all to give the one who has criminal instincts a chance to

reform before he becomes an actual criminal? Let us go back to the criminal's ancestors. The remedy of prevention should begin there where there should be obedience to physical and moral laws. The obedient ancestor prevents disease and crime in those who come after him. And now it begins to be plain why the judge, the jury, and the hangman come too late to reform the criminal. It was needful that his father or his grandfather should have had a little of that knowledge on account of a lack of which the people perish. Is it not true that the physician had more than ordinary wisdom who said that his patient ought to have sent for him when his grandfather was a young man?

The poorhouse, the jail, and the prison are costly luxuries. The vast sums expended in the construction and the support of these places would perhaps bear better fruit if they had been used in the education of those who have not the knowledge competent for self-support, as well as those who deem it right for them to appropriate the goods and to destroy the lives of others. Here, again, the objector comes in to say: "Do not presidents of banks and superintendents of Sunday-schools go criminal?" Oh, yes, that is so. My only answer to this is: Do not criminals in embryo become presidents of banks and superintendents of Sunday-schools, and, when the time comes, go criminal? No good reason has ever been given, and never can be given, why those who are so organized that they are liable to commit crimes should continue ignorant, should not be educated. They should be educated in the laws of morality, and taught the elements of the laws of the land in which they live. They should be taught, if possible, how important and valuable it is to have something to do, to have a legitimate occupation. In fact, every member of society should have a vocation, and there should be an imperative law compelling every one to work. The poor in the poorhouse should work accord-

ing to their strength, and help to contribute to their support. And many a criminal diathesis could be managed and utilized by work, by an education that looks toward utility and support. That republic is by no means ideal that is filled with paupers, criminals, and tramps. The song of the wandering minstrel may be sweet and pathetic, and it may for a time sing to sleep an inherent criminal monster. It is the policy of the State to make those who have committed crimes contribute to their support by work; let the State see to it that those who are born with the criminal diathesis are kept at work. Habits of industry are good for those who are inclined to be criminals. In fact, the power of habit is strong for good or for evil. Habit contains an automatic sequence that will operate in the line of self-supporting industry, and prevent many a person having a criminal diathesis from diverging into a life of misdeeds.

We have criminals always with us, and a little effort at proper treatment to-day and apathy for the rest of the year will do no good. The subject requires careful systematic consideration and persistent effort, day by day, and year by year. It is a problem in which every individual, from the lowest to the highest, is deeply interested. Strength comes not by observation, but by helpful industry in all the legitimate fields of labor. And to this end should the education of these afflicted beings tend. How much better it would be for the sustaining influences of the strong and good to be always thrown around the weak and bad, and thus prevent them from leading lives of crime, than it is to build prisons and surround them with bars, bricks, and stones! I know that prisons are necessary—not the prisons we have now; they blot the pages of our civilization—but prisons that are calculated to reform the prisoner. A man has small-pox; he is taken to the pest-house; it was not his fault; the people sequestrate him;

the pesthouse ought not to add any perils; in this way, the disease is kept from spreading; it had been better to have prevented this man from having a loathsome disease; but it is right to protect others from a too frequently fatal malady. A man commits a crime; he is taken to the prison; it may not have been his fault; the people sequestrate him; the prison ought not to add any perils; in this way, others are kept from being injured; it had been better for this man to have been kept from committing crime; but it is right to protect others from the depredations of the criminal. One of these cases is quite parallel with the other; great is sanitary medicine, but greater still is the *prevention* of crime.

And let me add that the inflictions of punishment for revenge will always defeat its ends and aims. The scales of justice will never balance on the point of that principle. There must be a legal compensation for crime; let it be, if you please, in the shadow of eternal justice. It is claimed that the law seeks the good of the State; but the criminal is part of the State, and must be included in the good of the State, which cannot be advanced by making the criminal worse. Look at this subject in whatever light you may, a great responsibility rests on the State in its treatment of criminals, not only in modifying prenatal conditions, but also in adjusting postnatal circumstances, when the criminal diathesis is at war with its environment, trying to attain a successful manhood, or trying to flee from the sword of justice, or, as best it may, trying to make compensation for the wrong that it has accomplished, being under restraint in such prisons as we now have, or, if it could be so, in the future ideal prison of reform.

Some one asks: "Shall we not punish the criminal?" I have not said that we should not. Every man should pay what he owes. What I have said is that the State should treat the criminal, and should treat him justly. And

the treatment of the criminal should contain everything that such a humane and generous word implies. The great criminal class should be taken *care* of with a wise foresight under the highest and best administration of affairs, based on the most complete understanding of the laws that govern society and the State, and the laws that dominate the physical and mental development and well-being of man.

DISCUSSION ON THE PROPER TREATMENT OF CRIMINALS.

Ex-Judge AMOS G. HULL: While I came too late to hear all of the excellent paper read by Professor Wight, one thought in it, which alone is worthy having a paper devoted to it, struck me with great force, and that is, the giving criminals appropriate occupation. Work has a good effect in more than one way; first, through its effect on the criminal himself, who may never have learned to work before, and having had nothing but bad surroundings, has not learned the necessity of working; and second, because the State, in compelling him to work, inculcates the important lesson of obedience and submission to a higher power. This discipline is itself the most efficient check of crime. The economical side of the question is also very important. Making prisoners work at least for their own sustenance is a great saving. As matters stood before the system of convict labor was introduced, taxpayers were burdened with enormous sums for the support of idle vagabonds, millions being expended in keeping them in idleness and giving them leisure to concoct schemes for new iniquities to be committed after their discharge. While I am far, as you see, from entertaining any morbid sympathy for criminals, I admit that distinctions should be made between different kinds of criminals. Some are criminals from association, never having had the opportunity of becoming anything else, and it is to these that the Ishmaelite's position, whose hand was against every one and every one's hand against him, has been made to apply. In fact, I recently heard an address by a criminal prosecutor from Washington, which contained the dictum that every man who committed crime was bad, and that he could not possibly be reformed. It was positively a disgrace to the society before which it was read, the Medico-Legal, and to the position occupied by the man reading it—I forget his name—the same man who prosecuted that fool, that lunatic Guiteau—

DR. C. S. WOOD: Corkhill!

Ex-Judge AMOS G. HULL: Yes, that is the name; he took that ground, and in such terms, and supported it by such diatribe, for I cannnot call it argument, that it was almost disgraceful to listen to him. (Applause.)

DR. CHAS. A. LEALE: My observations lead me to conclude that the chief element in the development of criminals is the fact

that bad associations in early life corrupt good manners. I have known the children of old respectable families, who remained resident in a deteriorating neighborhood, to turn out bad, while those removing to better regions grow up well as a rule. There is no period at which the prophylaxis against criminal tendencies can be carried out so well as early childhood, and we may well pause and deliberate upon a great and threatening evil, when we observe how the young are growing up in this city. That not all criminals are essentiately criminal at heart, as has been claimed in certain quarters, as Judge Hull has just stated, I am convinced. I was recently called to perform an operation on a prisoner in Sing Sing at his request. After communicating with the prison authorities, I attended him, and had an opportunity of seeing how things are managed there. I became convinced that the superintendent had the good of his charges at heart. My patient was occupied as a clerk, and enjoyed every reasonable comfort. The career of this individual showed that crime leading to a disgraceful fall may be committed without the ordinary criminal motives. He had an excellent education, had been brought up in luxurious surroundings, but fell into the hands of a bad woman, who gained complete control over him, and at last compelled him to commit the deed for which he was imprisoned, while holding a pistol at his head.

The PRESIDENT: Perhaps Dr. Wood can give us some information on the relations of war and crime.

DR. C. S. WOOD: I cannot say anything on that special point. As to the paper itself, I think it ought not to remain shut up in society archives, but be published in some periodical devoted to popular science. It is a very broad paper. If I were to criticise anything in it, I should be inclined to differ from the sweeping conclusions derived by Dr. Wight from a consideration of the heredity of crime, and which tend to make of crime, as of inebriety, a disease. That some inebriates and criminals are such by force of their organization is true, but still, most criminals are responsible by themselves. They become so through environment; many of our youth grow up without occupation, and drift into the criminal class, forgetful of their earlier training, if they had any. I, hence, from a prophylactic as well as curative point of view, thoroughly agree with Judge Hull as regards the beneficial effect of labor. It is certainly as much indicated in the case of the criminal as of the insane, who, we know, are much better managed by keeping them reasonably well occupied than when compelled to lounge listlessly around the wards of an asylum. I am sorry to

see that a certain class of people, particularly members of trades unions, are trying to undo what has been done in this direction, by endeavoring to deprive the prisoners of the little work which they are permitted or compelled to do in this State.

MAX F. ELLER, ESQ.: Whatever Professor Wight says, he clothes in so quaint and attractive a form that we are led astray, against our cooler judgment, into believing what is contrary to our reasoning. There was once published in Germany a work entitled "Guide for lovers and those who intend to become such." Dr. Wight might similarly have, in preparing his paper, made it cover, not only the case of criminals, but also of those who intend or are destined to become criminals, and this, I think, has not been done. Theories alone will not suffice, what we want in this Society are practical suggestions. Can we destroy the germ of criminality by sending children to the very Sunday-schools whose superintendents figure so extensively in the records of crime themselves?

I think the position of society towards the criminal has many analogies to its position with regard to color-blind persons. The color-blind person is in no way responsible for his defect, but society assumes with perfect justice the task of protecting itself against the results which may grow out of his inability to recognize colors. It prevents him from taking the position of an engineer, a pilot, or a station-master. In other words, it forces him into other positions in which he can do no harm. In the same way it has the right to force the criminal, whether so by force of organization or not, into a position where he is relatively harmless. It is true that abstract justice is better served in the former case, because every color-blind person can be tested before a disaster can happen through his inabitity to discriminate color signals. The only practical test of the criminal is his first crime. If there is any other let us hear it! It is all very grand and beautiful to say that it is our mission to prevent "disease," and equally impressive to say that we want to "prevent" crime. We all wish these and many other things, but in a Society like this we want more practical suggestions as to "how to do it."

DR. E. C. SPITZKA: Compelled as I am to dissent from one of the views expressed in the paper, I think it would be unjust to do so without paying a tribute to its excellent literary qualities, and to recognize the entertaining character of the instruction Dr. Wight has conveyed. It is universally admitted by anthropologists that there are some persons who are criminals by virtue of their organization. In exceptional cases the inherited and trans-

mitted tendency to crime is so great that the subject becomes a criminal in spite of the very best surroundings. I need but refer to the girl described by Hoffbauer, the daughter of parents who had been robbers, and who after birth was adopted by wealthy and worthy citizens; she grew up, displaying lying and thievish propensities and becoming an incorrigible masturbatrix at the tender age of four. I believe, however, that the paper greatly exaggerates the proportion of those who are criminals by virtue of such a faulty organization or hereditary influence. In a large prison which I recently went through, and which contained about three hundred inmates, I saw but two subjects on the male side who exhibited the somatic indications of a faulty organization, whereas the greater part of the remainder would have been able to shield themselves under the over-humane and liberal construction made in Dr. Wight's address. I am aware that Dr. Wight does not stand alone in his views; a Scotch prison physician or clergyman—I forget which—who gave the matter profound attention, arrived at very similar conclusions. I believe, however, that he and others have overlooked one important fact, the influence which monotonous and uniform surroundings have in moulding not character alone, but even the facial expression and which may exert even a deeper influence. Much of what has been considered the result of a faulty constitution strikes me as the consequence of uniformity in associations, other external circumstances, prison discipline, and habits of thought. It strikes me too that those who stretch the conception of the criminal organization so widely have failed to follow up the histories of individual criminals sufficiently often. If they did so, they would find that, like Hogarth's apprentices, the career of the criminal and the non-criminal is such because of very trifling external circumstances. The idler who is wealthy need not steal, the idler who is poor must steal or beg or die. In the case of the ordinary criminal, the crime has a clear motive; we may consider him a person of bad judgment because he selects so poor a method of making a living, or despise him that for a trivial gain he will jeopardize his liberty, and present an abhorrent spectacle generally, but we must recollect that there are few extraordinary acts, good or bad, that may not be criticised from a similar stand-point. Few men are practical disciples of Kant's categorical imperative. Every man has his price: in the case of the thief it is very small, that is perhaps not the chief point in which he differs from the diplomatist who will sacrifice a people, a friend or his honor to achieve a little personal aggrandizement, but it is one difference, and one of degree only. I say all this to

show how arbitrary is the term "criminal class." I know of persons inherently mean and wicked, who never commit a crime either from motives of caution or cowardice. I know good men, men whom none of us would blush to call friends, who would commit crimes of personal violence to-morrow if law and the social sense did not condemn them. Indeed there are many crimes, classed as such, which have nothing in common psychologically with ignoble crimes, if I may so term them. The murderer from passion or even revenge is often a much better man than the sneak-thief or defaulter, and certainly does not appertain to the class of habitual criminals!

This question has been recently complicated by one Benedict, a professor of nervous diseases at Vienna, but a most irresponsible romancer. He claimed to detect a criminal skull and brain type, and undertook to demonstrate these at a scientific meeting. Meynert and Heschl, two authorities of the highest order, instantly pricked the bubble, yet some writers have been found ready to follow Benedict. Strangely enough, he found that the criminal skull of the Sclavonic criminal was entirely different from the criminal skull of the French criminal. This blind admission may be taken as the quietus of his theory.

I must admit the possibility of a bias in my sharp discrimination between ordinary criminals, who become such by temptation, association, passion, or necessity, and that minority of criminals who are such by force of a faulty brain development. This bias may be due to an unwillingness to see the question of the responsibility of the insane complicated by such other questions as would arise out of an acceptance of the views expounded to-night. I am thoroughly committed to the doctrine of the irresponsibility of the really insane. I therefore require much stronger evidence than any yet advanced, to induce me to recognize in the criminal a subject allied to the lunatic. The lunatic sometimes commits a crime, the criminal is sometimes a lunatic, and alienists speak of a special class of criminal lunatics; but, for the great majority of criminals, it must be asserted by reflecting alienists that they are as sound of mind as many foolish, unwise, and wicked persons who constitute a large proportion of the human race generally, just as it is to be strongly insisted that the tendency to deliberate crime is not a general, a characteristic, or essential feature of insanity. On the contrary, even in the crminal lunatic the criminal tendencies and the insane development may be, and exceptionally are, separate manifestations, as disconnected as manifestations of one and the same mind can be.

E. H. BENN, ESQ.: While I only heard the conclusion of the paper, my recollection of its drift and of that of the ensuing discussion is, that much was said about the duty of the State to its citizens, particularly of that class within prison walls. That duty, however, is reciprocal in the first place, and in the second, the State does not only owe a due regard to the convict, but also to those who are liable to his depredations. Criminals have all means for knowing the nature and results of crime. When we bear in mind the risks run, the amount of stolen goods recovered back, the slight amount obtained by the thief from the receiver, and the expenditure of time, energy, and even of money in thievish undertakings, we are forced to the conclusion that crime is a most unprofitable business. In some criminals the desire to commit crime seems to be almost instinctive. One person after three successive confinements, being released, stole a log-chain on his way home, having neither use for, nor an opportunity of disposing of the article. I believe that such persons, not being able to resist criminal tendencies, should be restrained, and I agree with the reader and several speakers that they should be put to work.

Another class of criminals are addicted to the excessive use of stimulants. The demon is aroused within them, and violent crimes are the frequent result. These persons should, in my opinion, be more severely punished than others; they are certainly more dangerous, and it is most difficult to evade them, when imbued with their dangerous tendencies. The element of crime emanating from drunkenness can, I think, too, be more efficiently met by deterrent methods.

There was a reference to Sabbath-schools. I am not at all inclined to believe very firmly that the prevention of crime can be materially advanced through their agency. There is too much of outward piety without corresponding internal worth, and often assumed as a garb for rascality. It is generally understood that there are more defaulters among Sunday-school superintendents and such like than among any other class in the community. My impression, after some reflections on this subject, has become this, that there would be less crime if people were taught to do right for right's sake, and not because hell threatens those who do not do right.

EX-JUDGE HULL: If Mr. Eller's doctrine were correct, we would be going to the bad, whereas it seems to me—and I have watched the matter for a tolerably long period of life—that the world is getting better. There is also, it seems to me, a direct an-

swer to the question which he hints is unsatisfactorily dealt with to-night, namely, the "how to do it;" that answer is, educate people properly, and inculcate, by precept, example, discipline, and —if necessary—punishment, the supreme necessity of obedience to the law.

Some derogatory remarks were made about Sunday-schools. I do not believe myself that the Sunday-school is the best fitted field for this question; I deplore many of the teachings in our Sunday-schools, and think that instead of valuable and instructive to children, they are sometimes dreary and unprofitable. But the general scope of the Bible—I do not mean literally—is good and sound, and a very proper basis for instruction. It is true, as my friends say, that a great many Sunday-school superintendents finally enter the jail, but does it not occur to them how unjust to over a hundred thousand of sincere, pure-minded, and disinterested persons connected with Sunday-schools their sweeping statement is?

Then there is the surprising statement of my friend Dr. Spitzka, that every man has his price. I do not believe he could have meant it, for I know he himself avows no such principle.

DR. SPITZKA: I fear Judge Hull has combined with the word "price" a conception of a financial character, and I admit that the expression is misleading, as it was employed in such a sense by its inventor, a master at bribery and chicanery. I referred to the motive springs of human action. The purest and the best are actuated by ulterior considerations in most of their acts, and while one follows a certain line of conduct because it pays financially, another follows another line because he expects to reap a reward in a hereafter. One seeks notoriety of one kind, another of another. This one identifies himself with a principle, and there is no trick so subtle, no crime so great, that he may not perpetrate, though not selfish in the ordinary sense of the term. If we are honest before ourselves, we must admit the weakness of the human will when confronted with great temptations. In fact without the yielding of the greatest minds to such, history would be but a dull volume.

S. B. LIVINGSTON, ESQ.: It is so late that I will limit my remarks to one phase of the question. I felt considerably relieved on hearing one of the speakers repudiate the connection between crime and insanity hinted by others. Insane acts are not necessarily criminal acts, nor are criminal acts insane acts; criminal acts are often the result of rage, despair, or hatred, and they are

it is true, deviations from the healthiest type of the human mind, but they are not insane deviations.

The heredity argument is carried too far. On the same ground on which some theorists are endeavoring to refer all crime to heredity, the greater part of the human race would eventually be proven to be imbued with the criminal character. Indeed the term "criminal class" is itself an arbitrary designation. If it is meant to designate by this term all persons who commit crime, it becomes an *omnium gatherum* for various classes of persons who have very little in common. There is the ordinarily good person who commits a crime in rage, the deliberate forger, the thief from necessity, and the sneak thief and highway robber from choice, the conspirator, and the person who violates the law ignorantly. If on the other hand it is intended to include in this term all those who by organization have the elements which might constitute them criminals, a much larger number must be included than this term is ordinarily made to apply to. There are persons who would commit crime any day if necessity compelled, who are surrounded by the wall of society so firmly that they cannot break through. Others lack the single feature of courage, and remain good citizens merely through timidity. It seems to me that circumstances, surroundings, and false views of life make more criminals than heredity alone. It is difficult to treat of crime as a whole; it would be interesting to know, in regard to the relation of crime to insanity, which class of crimes preponderate among habitual criminals, and which among the insane. I do not know whether there are any observations made in this direction——

DR. SPITZKA: Quite a number! One of the best is by Knecht, physician at the Saxon prison at Waldheim. He found that among the insane, crimes of violence, such as homicide, assault, arson, predominate over the meaner variety, such as fraud, forgery, and theft.

MR. LIVINGSTON: That is a very suggestive fact, and seems to be opposed to the theory that criminality in itself is a disease. I dislike to refer to it, but it is unjust and extreme to hold Sunday-schools responsible for the crimes of a few Sunday-school teachers. Unless it were really shown that Sunday-school teachers as a class are more prone to commit crime than other persons, I can see no reason for referring to them as a class. It must be recollected that, in one phase of crime at least, the influence of society itself is bad. It compels the individual to conform to a false standard to which it holds him, till he breaks down financially and becomes a bankrupt or a thief.

In studying this question we must not fail to take into consideration the large class of "roughs," individuals who are sometimes within the pale of criminality and sometimes not, and many young men between fifteen and twenty-five join these dangerous ranks, from that admiration of physical prowess which seems to be inborn in the human race, for no profession is so much admired as that of killing. In Germany, for example, the men who stand highest in the esteem of the nation are those who wear uniforms, and the kingly influence sustains this unfortunate error of admiring courage for its own sake. Until a higher view is taken, I fear that the human race will look on crimes of a daring character with more leniency than they ought.

On the whole I believe in punishment as the only preventive against the encroachments of those who will not be governed in any other way.

DR. SPITZKA: While I agree with the last speaker in the main, his last observations on the question of physical prowess do not seem to me to have that bearing which Mr. Livingston intended. I have often taken occasion to polemicize against any exclusively intellectual training of the mind to the neglect of the emotions. Courage is certainly one of the noblest emotional states, elevating instead of degrading those who have it, as well as those who emulate it. If we inculcate courageous sentiments, we reduce the domain, if not of all crimes, at least of crimes of the meaner sort. A nation or community of brave men will be one in which ignoble crimes are looked upon with more contempt than among a servile or cowardly people, and certainly the sense of a community is a powerful incentive to self-control. I dislike to hear the profession of arms spoken of with disrespect, and this not because gilt buttons, epaulets, brass bands, and banners exert the fascination they once exerted, but because the instinctive admiration of whatever is bolder, dashing, and chivalric is one of the healthiest sentiments of the human mind, meriting rather encouragement than restriction.

DR. JARVIS S. WIGHT: I do not believe that the last remarks present my view of the profession of arms in the proper light. The law of self-defence is the first law of nature, and whatever is connected with this does not fall under what I referred to. Self-defence is an entirely distinct thing from the art of killing people in aggressive warfare. He who will not rise to defend his country is already in fact a criminal.

You may say what you like, gentlemen, dispute that this or that criminal belongs to the criminal class proper, debate till doomsday

on the causes of crime in this or that class, there remains the great and unsolved problem of dealing with a large class of the population in which crime is common. As long as it is better to develop a man into something good and useful before he may commit a crime, than to shut him up and feed a useless vagabond afterwards, so long it is our duty to strive to this end, and not to confess our impotence. We must try and try again to stem the growing tide of crime. You cannot prevent the criminal from propagating, his progeny are before you, and will be before you in ages to come, so I ask you, if physical and moral sanitation within and without prisons can modify and improve this progeny, whether we are justified in folding our arms and letting a great evil take its course? [Applause.]

FURTHER PROCEEDINGS.

After Dr. Wight had closed, a unanimous vote of thanks, as the result of a motion, was given Dr. Wight for his able paper.

It was then moved, seconded, and carried, that the recommendation of the Trustees as to the distribution of the "Transactions" be adopted.

Dr. Spitzka announced that, owing to illness, the work on the "Transactions" had been delayed, but that the volumes would be ready for distribution at the regular meeting in March; and on motion, he received authority to add the list of the names of members thereto. The meeting then, on motion, adjourned.

Thirteenth Regular Meeting, March 13th, 1884.

The thirteenth regular meeting of the Society of Medical Jurisprudence and State Medicine was held on Thursday evening, March 13th, 1884, at eight o'clock, the President occupying the chair. The minutes of the preceding meeting having been read, were ordered adopted, there being no objections.

The Committee on Publication handed in their report through Dr. Spitzka, which was, by motion, accepted and approved. The report of the Trustees was, by motion, postponed until later in the evening, owing to the absence of the Secretary of the Board.

Hon. AMOS G. HULL then presented to the Society a proposed bill entitled "An Act to Provide for the Establishment of Wills during the Life of Testators."

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

SECTION 1. To any will heretofore or hereafter executed, the testator may make and annex his petition, to be sworn to before and presented to the Surrogate for the county where the testator resides, or to any court or officer having jurisdiction to take probate of wills, asking that such will be admitted and established as his last will and testament.

SEC. 2. Every such petition shall contain averments that such will was duly executed by the petitioner, without fear, fraud, importunity, or undue influence, and with a full knowledge of its contents, and that the testator is of sound mind and memory and full testamentary capacity, and shall state the names and addresses of every person who at the time of making and filing the same would be interested in the estate of the maker of such will as heir if such maker should at the making of such petition become deceased, and may also contain the names and addresses of any other persons whom such testator may desire to make parties to such proceedings.

SEC. 3. Such court shall thereupon, upon the request of such testator, appoint a time for the hearing of such petition, and issue citations to the parties named in such petition, and direct published notice of such hearing, and have such hearing, after proof of service of citations and of publication of notice, in the manner, as near as practicable, as is required for the probate of wills.

SEC. 4. If any person named in such petition shall be a minor, or otherwise under disability, a guardian *ad litem* shall be appointed by such court to represent such person. On such hearing such court shall examine into the matters alleged in such petition and into the testamentary capacity of such testator, and examine witnesses in relation thereto, and if it shall appear that the allegations of such petition are true, and that such testator was of sound mind and memory and of full testamentary capacity, such court shall make decree thereon, and shall cause a copy of such decree to be attached to said will, certified under the seal of said court, decreeing that the testator at the making of such will and such petition was possessed of sound mind and memory and full testamentary capacity, and that said will was executed without fear, fraud, importunity, or undue influence, which decree shall have the same effect as if made by said court after the death of the testator on the probate of such will; and such will having been so established shall not be set aside or impeached on the

ground of insanity or want of testamentary capacity on the part of the testator, or that the same was executed through fear, fraud, importunity, or undue influence.

SEC. 5. Appeals shall lie in the same manner as from probate of wills.

SEC. 6. Nothing in this act contained shall be construed to prevent the revocation of such will, or alteration or other change thereof, as in ordinary wills.

The Secretary then read a number of letters expressing the views of the various writers, and which letters had been received by the President and Judge Hull: Messrs. Tristam Coffin, of Poughkeepsie; J. B. Jermain, of Albany; Platt Potter, Schenectady; J. S. Landon, Schenectady; D. R. Jaques, Dr. O. W. Wight, Detroit; Geo. H. Hopkins, Detroit; and Delano C. Calvin, formerly Surrogate of the County of New York.

65 EAST 56TH ST.

DEAR SIR:—I have the honor to acknowledge the receipt of your complimentary invitation to be present at the next meeting of the Society of Medical Jurisprudence and State Medicine, to participate in the discussion of the proposed bill to establish wills during the life of the testator. Other engagements will prevent my attendance, but I gladly comply with your request to give you my views of the bill.

I presume the scheme proposed has its origin in a desire to avoid the unseemly, and often scandalous contests of wills which have occupied so much of the attention of some of our courts.

The practical effect of such a law must determine its utility, and hence a consideration of its probable effect will be a legitimate basis of discussion.

It is quite apparent that in such a proceeding, the presence and examination of the testator, if he may be so called, would afford a very great aid in the determination of the inquiry, especially where the question of mental capacity should be involved.

However, in order to a satisfactory determination of the questions raised in such a proceeding, it would become necessary to disclose the *contents* of the testamentary instrument.

On the question of mental capacity, as the settled requirement to the establishment of a testamentary instrument is that the testator at the time of its execution must have sufficient capacity to comprehend the conditions of his estate, and his relations towards the persons who were, or might have been the objects of his bounty, and the scope and bearing of his will, it would seem

to be necessary to look into the provisions of his will in determining such a test.

In determining the question of *undue influence*, the *terms* of the will are most important elements of judgment, without which a just conclusion in most cases would be impracticable.

If I am correct in these assumptions, the proposed law would seem to forbid *secret* testamentary dispositions as a condition of *ante-mortem* probate. Hence it seems to me that a man of prudence would hesitate long before he would consent to subject his testamentary dispositions to the public gaze, the selfish scrutiny, and the invidious criticism of those relatives who may deem themselves entitled to share in his estate, and especially to invite offensive and impertinent importunities to change his will for the remainder of his life.

Knowing the infirmities of human nature, it seems to me that a proceeding to establish a will during the life-time of the testator in cases where next of kin deem themselves unjustly treated, would prove a fruitful source of family discord, discontent, and disruption, which would make him dread an *ante-mortem* dissection.

In conclusion, I entertain serious doubts of the feasibility of such a law. I am most respectfully,

Hon. William Barnes, Prest., etc. D. C. CALVIN.

Wm. Barnes, Esq., President, etc. MARCH 10th, 1884.

In answer to your inquiry of 11th inst., regarding my views as to the desirability of a law, a copy of which you inclosed, authorizing the proof of wills before death of the testator, I would say that I heartily approve of the same. I would suggest that, to avoid publication of the will, the proof of *testamentary capacity* might be held to be sufficient, unless the heirs-at-law insisted on reading the will, to prove *undue influence*. This they would hardly like to do before the death of the testator.

Yours very respectfully,

JAS. B. JERMAIN.

POUGHKEEPSIE, N. Y., March 10th, 1884.

Hon. Wm. Barnes, President, etc.

DEAR SIR :—I am in receipt of your invitation to attend the meeting called to consider the subject of the ante-mortem probate of wills.

I regret that I shall be unable to be present.

I am in favor of the passage of the proposed bill. It is sound

in theory, and deserves a practical test in this State. Will-makers should have the privilege of a "day in court," should not be denied the right to confront their detractors and oppose their charges in person. Let the experiment be tried. Very truly yours,

TRISTAM COFFIN.

SCHENECTADY, March 10th, 1884.

MY DEAR SIR:—"To provide for the establishment of wills during the life of the testators" seems just and wise. I fear, however, the proposed act you send me will, if enacted, open a wide door for deception. Thus the testator, to deceive his relatives, openly probates one will and secretly makes a later will; he may gain a fraudulent credit by probating a will which disposes of a much larger estate than he owns.

The proposed act should require at least his oath that he is acting in good faith; that he believes he has the property he claims to dispose of; and that he has no present intention of revoking his will.

I am afraid your act will not do much to reduce the litigation growing out of charges of testamentary incapacity and undue influence. To stop this, some stop must be put to the ease with which men are permitted to make new wills and codicils when they are broken down by that disease which ends in death. Then it is they easily become the prey of the stronger minds who watch at their bedsides, and, knowing what the old will is, prepare the sick man's mind to make the new one, which is theirs, and not his.

I do not advocate, but I suggest whether it would not be wise to provide in your act that a will once probated shall not be revoked or altered, except by an instrument similarly probated.

I am, may dear sir, very respectfully, Your obedient servant,

J. S. LANDON.

The Hon. Wm. Barnes, President, etc.

55 LIBERTY ST.

DEAR SIR:—Am sorry I cannot be present. I send a few memoranda. Very respectfully,

D. R. JAQUES.

I note a few points on a hasty perusal of the within.

1. *Title.* The scope of the act might be enlarged, and the title conformed by adding: "and to enable any one to take out a commission of lunacy on himself."

Sec. 2. Citations to "would be" here are unnecessary. No citation to wife, if married, or next of kin, if will disposes of per-

sonal property, is provided for, and in nine cases out of the ten heirs cited "would" *not* be the heirs at testator's death. *Nemo hæres vocatis.* The legislature can repeal the law of descent and dower in this case.

Sec. 4. "Other disability" than infancy, *e. g.* lunacy, would require a committee, not special guardian.

Sec. 4. The testator should be declared a competent witness in the proceeding, otherwise (the issue being soundness) putting him on the stand would *beg the question.*

Sec. 4. If the decree is "to have the same effect as if made after death," then, of course, the devisees can turn the testator out of house and home at once; and if, like Lear, he governed under similar circumstances, of course his subsequent unsoundness would not invalidate his previous work.

How is the fact of death to be ascertained? Respectfully,

D. R. JAQUES.

SCHENECTADY, March 11th, 1884.

Hon. William Barnes.

DEAR SIR:—Your circular invitation to attend a meeting in New York on the 13th inst. to hear a discussion on the subject of a bill for an Ante-Mortem Probate of Wills is before me. Temporary indisposition as to health will prevent my attendance at the time and place mentioned. I am entirely uninformed as to the practical value or working of such a law in the State where it has been carried into effect, and, of course, from a cursory view of the proposed provisions of the bill, I have no matured views in regard to its benefits (if any) should it be favorably regarded by our Legislature. I admit that, upon so hasty a consideration of its provisions, I am not prepossessed in its favor. Perhaps, like old practitioners under our existing statutes, I feel too much sensitiveness as to proposed changes in long-established practices and a jealousy of such radical changes. It appears to me from my superficial view that the two first sections add nothing to the solemnities nor to the securities now demanded on a probate. They require nothing that the existing law does not now demand as evidence of qualification or capacity of the testator to make such an instrument, and, as I think, may take from contestants the opportunity to show from surrounding circumstances the evidence of unsoundness of mind or improper influences which controlled the testator's mind at the time of its execution. The oath of the testator himself as to his own capacity and freedom from improper influences will, of course, never be wanting under such an act, whatever may be the opinion of others. He will never doubt his

own soundness and capacity, especially if he makes the application to establish it, and the greater his incapacity and disqualification, the more earnest and desirous will he be to sustain his own opinion, and, doubtless, conscientiously to verify it. Besides, the permission given him to be a witness implies that his oath is to be regarded as a part of the evidence in the case. This is a new feature in the law of evidence, whether wise or unwise is greatly uncertain. Without example or experience, I doubt it. Another objection to this bill, as it strikes me, is that it limits the persons who may be called as witnesses, first, to such as would be interested as heirs, etc., and to such others as the *testator* may desire to make parties to the proceeding. This might be a partial choice. It is possible that the devises and bequests in a will might be good or bad, though not made to either of the classes so named to be witnesses, and who would have no opportunity to show this on the trial, and thus have a decree made against their interests, which decree this new act declares cannot be impeached or set aside.

It is obvious that such a new provision would open a wide door for new litigation, for new statute and new common law construction of law, for new forms of proceeding, new rules of evidence unknown to the present practice, and to establish common law. There seems to be no provision in this bill that the will itself or its contents are to be (as is now the law in post-mortem cases) in evidence. This, as we all know, is sometimes better evidence of want of capacity than even the opinion of experts. Besides, I think the proof under the proposed bill would introduce a dangerous kind of evidence. Expectant heirs and devisees, called to testify, not knowing the contents, would come under the temptation that its establishment is to be for their benefit, and if, in the end, they have even testified against their own interest, the effect, if nothing else, would make them curse such a law. And still, under the provisions of this bill, the whole *trial* and decree is susceptible of being reversed, set aside, and nullified in one hour at the will of the testator, under section 6 of the bill.

Please regard this hasty, perhaps greatly prejudiced view of this proposed change in the law. I am sorry that, before writing it, I could not have heard you argue the other side of the question, or that I could not have had an interview with the Hon. A. G. Hull, the able and distinguished gentleman who prepared the bill, and who doubtless would have removed my objections or prejudices.

Please do not regard this as any disrespect (certainly not intended) to the well-considered and well-matured views of those who see its benefits, which I have not been able to see.

With kindest regards and great respect, I am truly yours,

PLATT POTTER.

CITY OF DETROIT,
HEALTH OFFICE,
Feb. 19th, 1884.

Amos G. Hull, Esq., No. 21 Park Row, Rooms 36-7-8, N. Y.

DEAR SIR:—The Michigan statute permitting proof of will during life of testator has been in force less than one year.

The preponderance of public opinion is in favor of the law. No test case has yet arisen to demonstrate the value of the statute. It is generally regretted that a section of the bill, providing for the establishment of a will without disclosing its contents, was struck out before its passage. I see there is some omission in the bill now before the Legislature of New York.

In my judgment, the power of cranks and befooled old people to dispose of the estates unjustly should be curtailed and not enlarged. Very truly yours,

O. W. WIGHT.

OFFICE OF THE ESTATE OF JNO.
D. BAGLEY, 48 Bates st.
DETROIT, March 1st, 1884.

Amos G. Hull, New York.

DEAR SIR:—Yours of recent date, asking if the recent statute of this State authorizing probate of wills during life of testator gives general satisfaction.

In reply, I might say as a certain lawyer said to me the other day: "Yes, every man, woman, and child is rushing to the Probate Office with their wills, and children are crying for it."

But really, so far as I know, it meets with general favor. A few months only have passed since it became a law, and it is too early to judge of its practical workings.

Several have been presented for probate in this county, and in two or three cases contests are now going on over the probate of such wills, certain legatees thinking the testator was unduly influenced because they were not remembered *sufficiently*, and the friends of law are watching these contests with some interest. I think the law, though a new departure, is a step in the right direction.

Quite likely there are defects in it which can be corrected in the future.

However, as I introduced the bill in our Legislature, and secured its passage, I may perhaps look upon it with too much favor.

Our Secretary of State had calls for copies of it from all parts of the United States soon after its passage, as it had been quite generally noticed in the papers. Herewith I send you a copy.

Yours truly,

GEO. H. HOPKINS.

After the reading, it was moved that the letters "be spread on the minutes." Seconded and carried.

The bill was then discussed by Judge Hull. It was then moved, seconded, and carried that each following speaker be restricted to ten minutes in his remarks, unless the time be extended by the vote of the body. The following gentlemen then joined in the discussion: Mr. Yeaman, Mr. Crane, Mr. Kitchell, Dr. Spitzka, Mr. Benn, Mr. W. H. H. Russell, Mr. Eller, Dr. Harwood, Col. Moulton, Dr. Leale, and Mr. Livingston.

DISCUSSION OF THE ANTE-MORTEM PROBATE OF WILLS.

Hon. AMOS G. HULL, ESQ.: Experience has shown that the settlement and administration of estates of deceased persons frequently develop the most curious attributes of human character: sometimes showing filia land parental love in their sweetest and most attractive forms; at other times, avarice and selfishness in their most hideous deformities, and not unfrequently malice and hate, and many of the most disgusting forms of human depravity.

The wisdom of the past has devised several plans by which the property of those in health, as well as those who are about to die, may be disposed of for the benefit of their kindred and for the public good. In England and in our own land:

1. By the rules of the common law.
2. By numerous statutes relating to the title, inheritance, descent, and distribution of estates.
3. By statutes relating to wills.
4. By trusts.

There has hitherto been no law in England or America, except a statute passed last year in Michigan, authorizing the establishment of wills during the life of testators. The bill under discussion, and which has just been introduced into the Legislature of this State, is intended to accomplish similar objects. Whether it will become a law remains to be seen. I offer the following suggestions in respect to the proposed bill:

1. The law as proposed would not abrogate or change the law as it now exists respecting wills or the distribution of estates in the slightest degree.

2. It adds a new and beneficent feature to the mode of proving wills which did not heretofore exist, provided the parties interested desire its benefits.

3. No one, by the act, is compelled or even advised to depart from the system or plan now in force. The amendment to the law affecting probate is merely *permissive*.

4. It is believed that thousands of testators, every year, will wisely continue to adopt the old plan of disposing of their estates.

5. It is averred and confidently believed th at hundreds of testators would wisely and prudently avail themselves of the provisions of the proposed bill, and would be glad of an opportunity so to do.

6. It is averred and believed that many contests in respect to wills that are now daily occurring would be avoided if the testator during his life-time had been permitted to cite all persons interested in the will to meet him, face to face, to challenge his mental capacity or the validity of his will, if they desire.

7. It is believed that a brave, fearless man, having, by his industry and the help of others, earned his property, and being so situated that he cannot die intestate without great injustice to those who have assisted him in accumulating his estate, but having, nevertheless, remote and perhaps unworthy relatives desirous of taking it *all* in case of intestacy, who should go before the probate court and say, *there is my will.* "Cite all persons interested to attend its probate. If any one shall challenge my mental state or allege undue influence, let him do it now; and if not, let his lips be sealed by the decree of the court, as mine will be when such instrument takes effect."

In nine cases out of ten, instead of facing the testator, unworthy contestants would retire from court with shame and confusion. So far as wills are concerned, the testator could prepare for his final rest like one "who wraps the drapery of his couch about him and lies down to pleasant dreams."

8. All good lawyers understand that there are a multitude of cases where intestacy would work irreparable injury, and for that reason the law has wisely provided that testamentary instruments may be made.

Many eminent lawyers and good laymen believe that a will could not be so easily overthrown while the testator is alive and could speak for himself as when the lips of the decedent are sealed in death.

9. A man, under this act, may, as at present, change his will as often as he desires. If it is objected that it will have a tendency to make men change their wills every new moon, then I reply they may do that now.

I have never known of a lawyer finding any objections to drawing a will for a good, sane, solvent client, even if he should apply every year for that purpose.

It has fallen under my observation, and many of my brethren have had like experience, no doubt, that many laymen who cannot consistently die intestate dread the ordeal of making a will for fear that it may be contested. Hence they desire this permissive act.

Can any good reason be assigned why such an aspiration should not be gratified?

Hon. GEO. H. YEAMAN: I have favored the bill, and do not think the objections urged are well founded, or in any way insurmountable. The objection that a man by proving his will while living might obtain a false credit is only ridiculous. A testator can devise or bequeath millions, in general terms, without revealing the extent of his estate. If he states amounts, and states more than he has, he will deceive nobody, and if he states it truly, and the showing is more than people thought he had, the *tax-gatherer* will be enlightened.

But we are told it will cause family discord. It is difficult to imagine how it could cause more discord and scandal than often arise under the present system of making wills, and having them attacked after the death of the testator. It would, on the contrary, tend to prevent discord and litigation, because a testator, thus inviting scrutiny while he lives, will be more apt to be fair and equal in his dispositions.

The subject of revocation by subsequent will, or of making a codicil to the will, presents no difficulty. It remains just as it stands. Neither is the will valid for any illegal purposes. The proceedings only establish soundness of mind, testamentary capacity, and the absence of undue influence. But if the will is against the law, as in the matter of giving too much to a corporation, or making an invalid trust, or suspending alienation too long, the law sets these provisions aside.

Neither is the statute exclusive. It is cumulative only. Men are not bound to pursue it. They can do so if they like, or they can pursue the present plan. What harm is there in letting a man have his choice?

Something was said, in one of the letters from the learned judges

and lawyers who have written to you about this bill, suggesting that it involved a change of the rules of evidence. I see nothing of the kind in the bill. It provides for the proper parties to the proceeding, but says nothing about witnesses and evidence—leaves that matter just where the law now puts it.

The bill has been ridiculed as an application by a testator for an inquest of lunacy upon himself. Not so. He simply asks to have his will proved, and if others allege he is *non compos*, the burden is on them. And, in prosecuting any such inquiry, I would ask Dr. Spitzka or any other expert present, in which case would he have more confidence in his own conclusions, or the facility of arriving at any conclusion—when he examines the living testator, or is called on to answer a seventeen-page hypothetical question after the testator's death? And do we not all know that some litigants will rake up all kinds of rubbish and scandal after a testator's death which they would not dare to bring into court in his presence, while he is alive, to contradict, disprove, or explain?

This bill was first passed in Michigan. It so commends itself to the common sense and to the legislative and professional mind that, in a few months after its adoption in Michigan, it has been introduced into the Legislatures of several other States. It is said to be approved by Judge Cooley, of Michigan. His equals on this continent as a judge and as a law writer can be counted on the fingers of one hand. Such facts and such an approval are worth something. The bill cannot be either a foolish thing or a dangerous innovation.

MR. CRANE: One great difficulty in following the proposed plan will be the proving of codicils, which would require a repetition of the entire process.

MR. C. H. KITCHELL: I should like to ask if it is proposed, in case a man has proved his sanity in making a given will, and being suddenly taken ill, desires to alter it, that the same process of proving his capacity to make a codicil shall be gone through with?

MR. HULL: Yes.

MR. KITCHELL: I must say that I have little sympathy with the view which opposes will contests because they tend to scatter and divide up estates. I do not believe in the accumulation of great estates, or in any measure which is calculated to facilitate such a process; for large estates, like powerful corporations, are a curse to any democratic government. I cannot agree with Mr. Yeaman that the passage of the proposed bill would decrease liti-

gation, or diminish asperity of feeling among the relatives of a testator. Nor do I understand, though it may be so, how it will enable a testator to carry out his wishes any better than under the present plan. I think if there is insanity that it can be as well established after death as during life, as I have no doubt my friend Dr. Spitzka will confirm, and certainly those who are insane will be least likely to be discovered to be so during life by this process, for insane men are not likely to recognize or to admit their insanity.

In my native State, New Jersey, such a bill is unnecessary, for it is impossible there to break any will, at least I have always failed in the attempt [laughter]. They there admit any will to probate, good, bad, or indifferent, just as they hang murderers whether sane or insane. I do not see why a man should not be allowed to establish his will during his life-time, but can he not dispose of his property just as well by gift or otherwise? The bill as it stands will not, I think, accomplish even this purpose. Suppose a man to have more property at the time he proves his will than he has at the time of death, or that he accumulates a fortune after proving it, what endless disputes would arise? As the matter stands to-day, respectable lawyers see to it that testators are sane, and undue influence can be proven in other ways, if it exist, than the one proposed.

DR. SPITZKA: I have been very much instructed and more puzzled by the written and spoken discussion of the bill presented by Judge Hull. The objections urged against the bill are of so exclusively legal a character that it would seem almost the monopoly of the legal side of the house to discuss them. I may urge in apology for venturing to speak on a subject regarding which my convictions are not fixed, that I have been appealed to by my esteemed friend, Mr. Kitchell, to sustain a view which, I regret to say, I cannot indorse. I do not agree that a diagnosis of insanity can be as well made after death as during life. True, a good expert may be more competent to determine the mental state of a person from a few facts than a general practitioner who has paid as little attention to insanity as the majority of those graduating in the United States, who has actually known the person. But granted that, under Judge Hull's proposed law, competent experts were to be selected to determine the mental state, they would certainly have at their disposal facts which might turn the balance of opinion one way or the other, and which the best post-mortem hypothetical might fail to include. Five minutes with a subject whose mental state is questioned are often—not always—more decisive than a

history covering years related by an incompetent observer. There are many hints furnished us by the expression of a person's countenance, and by certain physical evidences which may serve to guide the expert to an accurate and rapid analysis and sustain a deliberate conclusion, better than all the guesses of relatives, the hear-say evidence of neighbors, and the impressions of the laity generally.

I must say, without venturing for a moment to discuss the actual merits of the bill, that if it disposed of the disgraceful will-contests now going on, it would do a great deal of good. I have seen much of these contests, taken part in a great many, declined to take part in a great many more, and I can say from observation and experience that neither the medical nor the legal profession have any occasion to be proud of the spectacle furnished by them. I do not hesitate to say that half the evidence given in every will-case by medical men is rotten, and that wrongful testimony seems to serve the purposes of counsel as well, and to influence the opinion of surrogates as materially, as honest scientific evidence. Judge Hull will recollect a case in which he took part, where his opponent called a witness who contradicted himself at every step, who was so unfortunate as to have written a book on nervous diseases from which the Judge read extracts convicting him of testifying differently, declaring a hypothetical decedent insane, when in his book he declared sufferers from the same disease to be sane. In another case two "professional experts," in the worst sense of the term, testified that the delusion of marital infidelity was not a common one in alcoholic insanity, nor had it ever been so claimed by any authority—in direct opposition to the experience of at least one of them, and the unanimous voice of authorities. I could go on multiplying such instances. Many of the medical gentlemen here present remember the quandary of the writer who testified that there was no such term as moral insanity in science, and eight months later wrote a book proving its existence.

If medical witnesses are venial—I do not hesitate to use this term, in view of such time-serving declarations as those just referred to—lawyers carry no small share of the blame. There are different methods by which lawyers approach physicians. Under all circumstances, I may premise, the lawyer looks upon the medical witness as a tool, as a wheel in the mechanism by which he expects to do the best thing for his client, sometimes without any regard to the abstract justice of a case. Some know how to select a good tool, others select bad tools, and as our system now is, it does not seem to make any difference which they select. If ex-

perts have become, as it were, fifth wheels to coaches, they have themselves to blame for it. They are—or, I should say, a portion are—too eager to be called as witnesses to pay that attention they should to the scientific and moral merits of a case. There is one of these gentleman who, to my knowledge, has approached more than one court clerk to recommend him to disputing parties. There are a round half-dozen who will appear on any side which calls and pays them. I have found that it is temporarily detrimental to a medical man to be too fastidions in regard to the purity of a cause. Many lawyers will laugh at him if he spurns a contingent fee arrangement. Others will think him a dangerous witness, perhaps with reason, because he will not slur over some unpleasant point and lay undue stress on others.

The more dignified his position, the more isolated it will become. I think the day will come, if our present system is to continue, when lawyers will learn the lesson which I have so long been endeavoring to impress upon those with whom I have come in contact, and which I have succeeded in conveying to some of the best members of the bar, that the greatest good to be obtained from an expert is, not his statements on the witness stand, but the scientific arrangement of related facts, the sifting out of unscientific inconsistencies—in short, the historical and logical association of testimony into a scientific and harmonious whole. On the witness stand he not infrequently resembles the poll-parrot, giving carefully prepared answers to as carefully prepared questions. Off the witness stand, he ought to be what a real expert can best show his capacity in—a guide and counsellor, in the special question of mental unsoundness or soundness. Under the proposed bill, whatever may be said about it otherwise, expert testimony would be raised in dignity, in scientific value, and in public estimation above its present low *status*.

MR. E. H. BENN: After carefully weighing the arguments advanced for and against this bill, I am forced to conclude that the objections against it counterbalance its good features. If I were a member of the legislature, I should vote against it. Our existing laws are good enough and simple; indeed, I do not hesitate to say that we would be better off without any wills, for the legal distribution of property meets all reasonable ends. The public ought to have something to say—through the law—as to the distribution of property, for it is not a benefit, but in the end a detriment to the public, when one child gets two hundred thousand dollars, and the rest nothing. I usually sympathize with the contestants for this and other reasons. The objection has already

been noted by one of the writers of the letters read that a man can't be prevented from making a second will, while every such will, codicil, or other provision, would necessitate a new trial.

COLONEL MOULTON: That is in Judge Landon's letter!

MR. BENN: Yes. Let us now suppose a man going to prove his sanity in order to make a will. Undoubtedly some of the legatees might be dissatisfied with the provisions if made public, and family discord arise in consequence, defeating the avowed object of the bill. I can even see how dissatisfied persons might be moved to exert an undue influence on a testator, looking to the making of a second will.

W. H. H RUSSELL, Esq.: The practical suggestions and cogent reasons advanced by the learned and distinguished medical expert who has preceded the last speaker, ought to satisfy any professional mind, familiar with the contest of wills, that the proposed amendment of the law concerning wills is, in many respects, a necessary one.

If we reflect a moment as to the true significance of the *term will*, we must conclude that there is much philosophy in a measure that would tend to prevent the scandalization of a person's memory after death. It is a well-known fact, to the professions of medicine and law, that wills are generally contested upon the grounds of *insanity* and *undue influence*. As an illustration, take the great Girard Will Case of Philadelphia, which was finally adjudicated in the Supreme Court of the United States. Stephen Girard amassed a great fortune, and in one of his bequests founded and provided for the famous Girard College. The will was contested by some of the heirs and relatives of the deceased, upon the ground of insanity and undue influence. Daniel Webster, in fact the best talent of the legal and medical prpfessions were engaged upon the case.

It was urged with much force by Mr. Webster that, because the will contained a clause precluding all ministers from entering the institution, Girard had been unduly influenced, and was insane at the time of executing the will. The jury and all the courts sustained the will, upon the theory that the clause in the will was of itself no evidence of insanity. In fact it was the best evidence of foresight and sagacity.

Girard desired, that after the student entered the college, and and as he left it, the mind should be perfectly free from all sectarian influence or impressions. No one will for a moment question the sanity of a philanthropist who desired that the mind should be fully developed and disciplined independent of all extraneous

matters or impressions as to any particular creed. In fact, if the church dissensions of to-day are any criterion of the true inwardness of such organizations, then it was wise in the devisor to prevent all possible elements of discord.

One of the strongest features of this proposed law is, that every person possessed of property which may become the subject of bequest and contest, will be at liberty to take the benefit of this law, if so desired by the devisor. It will be optional with the testator to have the questions of influence and sanity determined before death.

As Dr. Spitzka has well said, one of the best and surest tests of a person's insanity, to the medical expert, is the presence, looks, and actions of the person whose mental condition is brought in question.

The human eye, through which the mind looks out from its wonderful tenement upon the things of this world, is, to the expert, an infallible criterion of the mental condition, and I would prefer the opinion of the true experts, from that stand-point, to all the books and hypothetical cases that can be found in the entire domain of medical science. As this world goes to-day, any person possessed of property worthy of bequest might very properly hesitate, some time, as to its disposition, unless the same chanced to be in money and bonds capable of distribution from hand to hand without an order or decree of court. Indeed, if some of the worthy and wealthy people who have amassed fortunes by frugality, skill, and honest industry, and have passed away, leaving millions for distribution, could come back from their mysterious realms and witness the contests, trials, bickerings, and family feuds that have arisen because of the estate left, they would regret that they ever left a dollar in this world. I respectfully suggest to the learned author of the bill, Judge Hull, that it should contain a clause to the effect that the contents of a will should not be disclosed before the death of the testator, only to the court and competent medical experts, who should be sworn never to reveal the same until after his death.

And the object only of the experts seeing the same would be to enable them to take the context of the will as a fact or circumstance, with the other evidence in the case, in forming their opinion, and they could be called in at the signing of the will or the presentation of the same to the court by the testator. The will should then be sealed up in the presence of the judge, and left with the court, subject to the proceedings of contest (if any were made). Every person or party interested in the estate should be

properly notified of the fact that a will had been executed and filed; and if they wished to question the condition of the maker of the will as to sanity or influence, they would have that privilege; and if they did not see fit to do so, they should forever thereafter be estopped from questioning those facts.

If such a law were in force to-day, much post-mortem scandal would be prevented. The witnesses would then have the greatest incentive for telling the truth; they would be brought face to face with the testator, and no child, widow, heir, or legatee would be disposed to testify falsely as to the characteristics of the person whose will was in question. When the lips are cold and silent, and the person is laid away in the solemn chambers of the dead, interested parties are quite disposed to say things about the deceased which they would not if the person were alive.

In a very recent case, in which I took part as counsel, the contestants produced some sixty witnesses who testified to mere eccentricities that were construed as delusions, whereas, if the party had been living, no one would have questioned his testamentary capacity. Justice Thomas M. Cooley, of the Supreme Court of Michigan, the well-known author of Constitutional Law, and the Dean of the Law Faculty of the University of Michigan (in which State a similar law is now in force), sanctions the policy of such law. Maryland is about to enact the same law; and we predict that, if this law is enacted in New York, it will never be repealed, because it cannot be objectional to any one, since it is purely optional with a testator. Such a law would not increase litigation, nor create family discord, because the validity of the will could be fully and finally determined during the life of the person executing the will. The greatest of all living public amusers, Mr. Barnum, last summer made his will and requested some of the best medical men in Connecticut to examine him and certify that, at the time of making the will, he was of sound and disposing mind. The experiment of such a law can do no harm and may accomplish much good. Because it is novel should not defeat it; the greatest and most benign of all legislation has, in many respects, been novel. If such a law would secure the lives and memories of the dead from post-mortem scandal and disgrace, and tend to the impartial administration of justice, we commend it to the careful consideration of our law-makers at Albany.

MAX F. ELLER, Esq.: I hope I will not be accused of levity or a desire to stifle honest opposition to the measure under discussion when I say that nothing that has been advanced here as an argument against the adoption of this proposed bill

has seemed to me to rise above the level of finical and flippant criticism. One gentleman has said that a man who wishes to dispose of his fortune during his lifetime, had better give it outright to his sons or his sons-in-law. But I ask, what shall become of the man himself? If he gives to others, nothing will remain for him to enjoy during his life. But, on the other hand, if he makes a will, which, on a previous occasion, I ventured to characterize jocosely as "a dead give-away," he retains control of his property during his life. Another speaker expressed his fears of endless and expensive litigation as a result of ante-mortem probate. This, I think, is groundless; for, if the will is probated, very few, if any, interested parties will, during the testator's lifetime, venture to litigate the question of his sanity or freedom from undue influence. Should they do so, however, there is this consolation, that the litigation will not all occur after the testator's death, and the decision of the Court of Appeals will not have to be waited for so long after that event.

It has also been said that this measure would lead to family squabbles and bickerings, and the testator's "lot would not be a happy one."

My answer to this is, the man who has the courage to publish his will before his death will also have the courage to uphold and defend it against the possible onslaughts of dissatisfied heirs.

While discussing this measure with its author a few days ago, I suggested the advisability of making it optional with the testator of publishing the contents of the will or not, and suggested that it be exhibited only to a commission prior to probating it. Since then I have come to the conclusion that this plan is not feasible, and for this reason: While a man's sanity may and can be inquired into and determined extrinsically without knowledge of the contents of the will, yet the question of undue influence cannot be examined and decided without such knowledge. For this purpose an inspection of the will by the heirs is an absolute necessity.

Similar measures are now and have been for years in practice in many continental countries, and seemed to have worked well. As this is only tentative and not compulsory, there seems to be no reason why it should not be adopted. Let those who are afraid of acting under it refrain from doing so, but give those who consider it wise and beneficial an opportunity of testing it. And if the future should demonstrate that it is vicious, or unwise, or superfluous, it either will remain a dead letter, or it can be repealed.

MR. MOULTON: As I understand the proposed bill, it grants the privilege to publish a will during the life of the testator, and to have such publication authenticated by a decree of a court of competent jurisdiction, after proof that he possessed the legal capacity to make a will. In other words, the proposed statute seems to permit any one desiring to make a will, to take upon himself the burden of proof to establish his capacity, and to authorize the court to hear and determine that question.

I do not now think of any serious objection to such permission. If any one is brave enough to go into court, taking upon himself the affirmative of establishing his sanity, I think he or she ought to be permitted to do so.

It would require a brave man indeed to make such an attempt, especially if he fully understood that the question of his sanity was to be decided by experts, with the burden of proof upon himself. Still I repeat that I do not see how any harm can be done so long as the statute is permissive only.

Should it be attempted to make it compulsory, there would be danger of mischief, but as long as no one need comply with its provisions unless he desire to do so, the privilege of so doing ought not to be withheld.

It might perhaps be well to call attention to the fact that the history of wills shows that they were not originally secret, nor were they intended to remain inoperative until the death of the testator. On the contrary, the original will or testamentary distribution of property (from which our own has been largely copied) was published during the lifetime of the testator, and was intended to take effect immediately or prior to his death.

I have not time to explain here how it happened that such publication of wills was discontinued, and their operation postponed until after the death of the testator. It was largely due to the influence of religion upon politics.

It ought, however, not to be forgotten that *ante-mortem* disposition of property is not an absolute right.

All civilized governments claim and exercise the right to regulate to a certain extent what shall become of the estates of deceased persons, and these regulations are among the most difficult of legal questions.

In many of the continental States of Europe, the power to distribute property after death is limited to a small proportion of the whole. In the State of Louisiana a similar limitation is prescribed. In most of our States the only limitation upon the testator is that in favor of the wife, and that it usually extends to real estate only

While I am in favor of granting permission to those who desire to prove and publish their wills *inter vivos*, I should consider any attempt to compel this to be done with great apprehension.

I have not compared the terms of this bill with the existing laws with sufficient care to enable me to determine what their effect would be. But it has occurred to me that the proceedings, in the nature of a trial proposed by it, would be ineffectual in those cases where those who claimed an interest in the estate were residents in other States. It would probably be claimed by them that they were not bound by the proceedings unless they were parties to them and were served with notice.

These suggestions are made to enable the promoters of the act to consider and provide for them, and to induce caution in introducing any new feature in the law.

DR. C. A. LEALE: I believe that the ante-mortem probate of wills may be the means of preventing much anxiety to the testator, who desires that full justice be accorded to those whom he wishes to benefit, and also often will be the means of amicably settling estates without the public scandal witnessed when the opponents magnify the peculiarities and idiosyncrasies of a testator. It gives the testator an opportunity, during lifetime, to prove that at the time the will is executed he is of a free and disposing mind, and at the same time forcibly draws his attention to the contents of the will, so that subsequent deliberations may correct any unintended wrong. Dr. Leale then mentioned an instance where a testator during the lucid, but supposed dying moments requested all to leave the room excepting his medical adviser, and then said that he had been persuaded against the dictates of his own judgment to disinherit the only child bearing his name, as a consequence of endeavors to prove illegitimacy. The testator himself doubted the legitimacy of the child. The mother was dead, and in justice to the memory of his wife and supposed child, he desired, if possible, to solve the mystery, and prevent a wrong to his wife and an injustice to the child who, after he became an orphan, could never vindicate his position in life. The testator therefore asked Dr. Leale's opinion, and stated that he did not wish to leave his property to one who was in no way related to him, and who perhaps had been fraudulently imposed upon him, as the mother's relatives had already given him much trouble; and if he could be persuaded that he was the father, then his duty to his dead wife and living child was clear. Dr. Leale told the testator that he would endeavor to solve the mystery; he then visited the child and examined him while in a nude state, and found peculiarities

of hands and feet so unusual, and yet so exactly like those of the testator, that he became convinced of the impossibility of such exact deviations from the perfect form of body, except in a child of the supposed father. Such evidence could never be procured if required after the burial of a testator, should a post-mortem probated will be contested. In this instance the father was joyfully convinced that the child was his; he then revoked his former will which left all to strangers, and did full justice to the child.

MR. S. B. LIVINGSTON: The proposed legislation, being intended to meet a great and growing evil, is entitled to consideration. It is in the nature of an experiment, and in view of the magnitude of the evil which it is intended to meet, we may perhaps do well to limit ourselves to the inquiry what mischiefs might flow from its adoption.

My reflections lead me to the conclusion that the measure will fail to answer the expectations of its promoters, but nevertheless I would favor a trial of it, but for one or two objections which I beg leave to suggest.

The scandalous disclosures attendant upon unscrupulous attempts to upset wills should not weigh too much with us. We must not forget that many wills are set aside, and the fair legal presumption is that they are justly set aside. Indeed the power of testamentary disposition is frequently abused, and there are cases in which judges of probate have freely commented upon the obvious cruelty and unnaturalness of the instruments they are compelled to sustain.

I do not see any very obvious objection to the plan of providing some means of permitting those who fear that their wills may be attacked upon the grounds of their insanity to have the fact of sanity established before death. I am satisfied, from the arguments I have heard from both physicians and lawyers, that such a provision is much to be desired.

There is, however, a serious objection in mind to the bill so far as it seeks to have the question of undue influence settled in the same way.

In the first place the "undue influence" may be quite occult and unknown while in operation. Indeed it is likely to be. We have all heard of the case in Brooklyn, where a man passed as a single man for many years in one part of Brooklyn, among a large circle of acquaintances; while in another part of the city he figured as a husband, and the father of a numerous family—and all this unknown to the world, until his death precipitated the disclosure. Similar instances are not uncommon. The "undue influence"

is likely to be a secret one, yet the bill offers no relief in cases of after-acquired information.

Passing over what in my mind is more deplorable than any scandal, viz., the unjustly treated child *compelled by law* to bear the wrong or disclose the shame of a living parent, I come to another, and what I think is a fatal objection to this branch of the bill. It would be practical foreclosure upon persons wronged by a testator in his will. Who would dare, more especially if there was a small provision for him in a will, to risk the vengeance of a testator by seeking to have it set aside? He could not succeed if he could not discover the undue influence; he would not dare to seek for it; he could hardly establish it with a testator alive to deny its existence. He would be most unfortunate if he succeeded; the testator would then see to it that it would prove a barren victory. It would practically leave persons thus wronged remediless. They would not attempt to set aside the will. There would be no scandal, but the odious spectacle of irremediable injustice compelled to silence by the law. This could occur if this measure became a law in its present shape, and this possibility is intolerable to the sense of justice.

I am in favor of the law so far as it concerns the establishment of sanity or insanity before death, but I think it should be limited to the establishment of that one fact.

MR. RUSSELL then offered the following resolution: "That it is the sense of this Society that the bill now pending before the Legislature, known as 'An Act to Provide for the Establishment of Wills during the Life of the Testator,' is expedient, and that we cheerfully recommend its passage." This was amended by Colonel Moulton as follows: "Resolved, That this Society is in favor of the passnge of an act by the Legislature giving the privilege to testators to probate and publish their wills during the life of such testator, and that the passage of pending bill be so modified as to grant such privilege." Seconded. The motion as amended was accepted by the mover of the original motion, and then adopted by a vote of 19 to 3.

MR. THERON STRONG presented to the Society, through the President, a printed copy of his argument in the Stokes' will case. By motion, a vote of thanks was given to the donor for his contribution.

The Society then adjourned.

REVIEW DEPARTMENT.

DISEASES OF THE BRAIN AND SPINAL CORD. By DAVID DRUMMOND, M.A., M.D.

In this work the author has attempted to present a guide to the pathology, diagnosis, and treatment of nervous diseases, in a small handbook printed in very large type, with broad margins. In his preface he alludes to it as a short and very imperfect treatise. We agree with him fully.

A book appearing under the title chosen by Dr. Drummond may appeal to one of two classes of readers; either to the general practitioner, or to the specialist in neurology. If it is written for the first class, it should contain a clear and concise presentation of the most important features of the subject, bringing the statement of known facts and accepted theories up to the date of its issue, presenting the most recent discoveries, and affording a useful summary of all available knowledge in this department. An excellent example of such a book is Gower's monograph on the diseases of the spinal cord, which has been so well appreciated that a third edition has just been published.

If the book is written for the use of specialists, it should be an exhaustive treatise, beginning with an historical introduction, discussing isolated facts, tentative hypotheses, fine distinctions of diagnosis and of pathology, detailing all methods of treatment, and offering the original observations of its author and of others in an impartial but keenly critical manner. Such a treatise is the recent work of Wernicke upon Diseases of the Brain.

The work at present under discussion cannot claim to belong to either of these two classes, since it does not fulfil the conditions of either. It aspires to a place in the first class. But the general practitioner will find a much more clear, intelligible, and useful summary of the subject in almost any one of the recent general text-books on the practice of medicine, while the works of Bristowe in England, and Flint in America, will afford him more de-

finite information both as to pathology and as to diagnosis of nervous diseases than this special treatise of Dr. Drummond. Nor can Dr. Drummond claim for his work superiority over these text-books upon the ground that it is more recently published, for its most noticeable defect is the absence of any allusion to many of the brilliant discoveries which have attracted attention to the department of neurology during the past three or four years.

The work opens with a chapter upon the anatomy of the brain. In his description of the convolutions, the author follows the eighth edition of Quain's Anatomy (1875), making no mention of Ecker's work, the nomenclature of which has been adopted almost universally, and is incorporated into the last edition of Quain (1883). The old terms, ascending frontal and ascending parietal, are retained for the central convolutions, and these are said to unite in the superior parietal lobule, which in fact lies posterior to the paracentral lobule in which these convolutions meet. In the description of the cranial nerves, the old English system of numbering them from one to nine is retained—a system which has been abandoned even by recent English authors, and in all other countries was long ago replaced by the more rational system which numbers them up to twelve. The description of the anatomy of these nerves is especially defective. Dr. Drummond traces the olfactory nerve "to a nucleus in the substance of the temporo-sphenoidal lobe," citing Quain as authority, but he omits to state that this is but one of three possible terminations mentioned by Quain for the external root of this nerve, and that there are middle and internal roots which do not pass to the temporo-sphenoidal lobe. He says that the optic nerve arises chiefly from the anterior of the corpora quadrigemina, and in part from "the cells which occupy the lower stratum of the optic thalamus;" both of which statements are incorrect. The termination of the optic tracts (each of which contains a portion of both optic nerves) is in the corpora geniculata and pulvinar or posterior outer third of the optic thalamus, neither of which are related to the "cells which occupy the lower stratum." Some of the optic fibres undoubtedly pass over the thalamus and reach the corpora quadrigemina, but they are a small number, and the recent experiments of Bechterew throw some doubt upon the theory that they form the sensory tract of the reflex arc whose motor fibres control the iris.

The original diagrams on this chapter certainly require the apology with which they are introduced. They are a sort of Chinese

puzzle even to one who is familiar with brain anatomy, and are not calculated to inspire enthusiasm with that study in the mind of a student. But a failure to produce intelligible diagrams does not excuse the author for mistakes in reproducing those which he has copied from others. Fig. 12 is said to be taken from Erb, but Erb never conveyed the idea in his scheme that the superior olivary nucleus was considerably larger than the olivary body.

While we are ready to admit that a clear presentation of brain anatomy in a concise form is yet to be produced, the opinion is forced upon us that, had Dr. Drummond derived his knowledge from personal observation, and not from old and superseded authorities, his attempt might have been more successful.

The chapter upon the functions of the brain is a rough summary of the early discoveries, but is lacking both in definiteness of statement and in knowledge of recent research. Ferrier is followed implicitly, no mention being made of the work of Tripier, Munk, Goltz, Nothnagel, or other continental physiologists and pathologists. In fact, it is evident throughout the book that either insular prejudice or a lack of familiarity with foreign languages has prevented the author from keeping abreast with the progress made in neurology upon the continent. As a result, he is about four years behind the Germans. But there are statements in this chapter which he would find difficult to prove even from English authorities; such as that injuries of the corpora striata produce "circus movements;" or that "division of the abducens nerve causes an external strabismus."

The chapters upon the anatomy and physiology of the spinal cord are no more satisfactory than those upon the brain; and here the author shows himself to be far inferior, in clearness of statement, to Byron Bramwell. It was the chief merit of Bramwell's book that new and very clear diagrams were accompanied by concise and intelligible explanations. Both of these desirable features are wanting in this work. And, considering the recent date of Bramwell's book, we fail to find a *raison d'être* for this one.

An accurate diagnosis of diseases of the nervous system can only be expected from one whose knowledge of the anatomy and physiology of the nervous system is accurate, and where the latter is deficient, the former becomes suspicious. There are many errors of statement regarding the symptomatology of brain disease to be detected, and there is an indefiniteness of expression in the sections upon diagnosis which does not inspire confidence in regard to the skill of the author.

The existence of more than two forms of aphasia is ignored.

The statement is made that in hemiplegia the muscles of the back, neck, thorax, and abdomen escape paralysis.

The writer believes that he can differentiate cerebral anæmia from cerebral hyperæmia by means of the ophthalmoscope.

In the chapter on symptomatology of brain disease; no mention is made of vertigo or choked disc, the latter, however, receiving a notice in a chapter on methods of investigating the symptoms of brain disease. The arrangement of the subjects is such as to lead to the supposition that in proof-reading the pages were badly shuffled. Cerebral hemorrhage—badly named apoplexy—and cerebral embolism are separated by a chapter on meningeal hemorrhage, and cerebral tumors and cerebral syphilis are preceded by ten chapters on meningitis and other subjects, so that any one wishing to look up a differential diagnosis between these four conditions has to search the book through. And even when they are found, he will be disappointed, for the author does not state concisely the distinguishing symptoms of each in contrast with the others.

Among the chapters on spinal cord disease, we have space to refer to but one, and have selected that upon locomotor ataxia as the most important. No reference is made to the hereditary form of this disease, first described by Friedrich, and now recognized as distinct from other forms; but the author says: "Hereditary influences are said to have an important bearing on locomotor ataxia, but my own experience has led me to the conclusion that heredity has little to do with its production." Gastric crises are mentioned with ataxic gait and pain as very common symptoms, when in reality they are rather the exception than the rule. Dr. Drummond thinks it is a difficult matter to test the muscular sense. He is probably unfamiliar with the accurate and delicate method of testing it proposed by Nothnagel, according to which the patient, with his eyes closed, is required to reproduce in one limb a forced position given to the other by the physician. Many of the well-known tests for ataxia are not mentioned. Some of the rare symptoms, *e. g.*, perforating ulcer of the foot, hemiatrophy of the tongue, are omitted entirely. The section on treatment is compressed into seventeen lines, many useful remedies for the relief of symptoms, *e. g.*, the use of the faradic brush to allay the lancinating pains, etc., being left out. It is not sufficient to state that "hydrotherapeutics may be of service," or that "galvanism is useful." The practitioner, for whom the book is ostensibly written, would probably like to know what form of these agents is best—hot, tepid, or cold bath, constant or slowly interrupted galvanic current, applied in

the stabile or labile methods, etc., etc. As it is now pretty well agreed that hot baths do harm, this fact should have been stated.

In the sections upon functional diseases, the subject of treatment is handled in a hesitating way, and it becomes evident that the author does not experiment with new remedies, although he frequently recommends the domestic favorite, the hot foot-bath, under the more dignified title "pedeluvium."

The book is evidently a reproduction of a set of lectures delivered in the Medical School of Durham. They may be suited to introduce students to the subject of nervous diseases. They will neither instruct the average practitioner, nor add to the reputation of Drummond. M. A. S.

THE RELATIONS OF MIND AND BRAIN. By HENRY CALDERWOOD, LL.D., Professor of Moral Philosophy, University of Edinburgh. London: Macmillan & Co., 1884.

This is the second edition of this work, the first having been issued in 1879; whence it would seem fair to conclude that the book has met with favor in the eyes of those who read such works. We regard this success with much pleasure, inasmuch as we hail it as a sign of the changing drift of what was, ten or fifteen years ago, purely metaphysical thought. Mr. Calderwood has erected a platform, as it were, upon which the metaphysician pure and simple, and the uncompromising materialist can meet as upon neutral ground. Possibly, therefore, he has done a more useful deed than if he had been more logical and less afraid of the conclusions of logicality; for, by his moderation and attempt at reconciliation of two opposing doctrines, he lures on the one and the other dogmatist to an insight into each other's position. Your metaphysician of the true blue blood—*i. e.*, such of them as have not yet had the good taste to die or change their opinions, is of a stiff-necked race, and hard to bend, and cannot usually be made to give any serious consideration to the facts of materialism. Your materialist, upon the other hand, is self-sufficient with the self-sufficiency of one who, being in the latest fashion, feels certain that he has gained possession of the truth, and scorns those who have gone before him as mere gropers in the dark. Any one who brings the two together, and makes them acquainted, will thereby teach each that the other has matter for thought; and the metaphysician will have gradually steal over him the awkward conviction that the materialist is rather a hard-headed fellow, whilst the materialist will be surprised to ascertain that the metaphysician has been a keen observer in many matters, albeit his

theories are often fine-spun, it may be transcendental. There is no alienist who will not be benefited by a perusal of the works of Locke, Abercrombie, Reid, Hamilton, nay, even Kant, the mystical Schopenhauer, or the visionary Swedenborg; this, too, however familiar he may be with the cerebrum clinically, autopsically, and microscopically, whether in a physiological or a pathological way. Why? Because all these authors, men of genius, or, in plainer phrase, men of very unusual intelligence, have made it the business of their lives of genius, *i. e.*, very unusual intelligence, to make a study of mental manifestations. It would have been sigular, indeed, if all this expenditure of keen-sighted energy had gotten hold of no truths. On the other hand, it would be the height of presumption for any metaphysician of the present day to remain ignorant of the teachings of the modern materialist in regard to the brain and spinal cord; because a thousand phenomena appertaining to brain and cord have been brought to the light by modern research. Professor Calderwood, by endeavoring to fuse the doctrine of the two unfriendly schools of thought, has therefore done a wise thing.

In its main purpose the book is thus highly laudable, the more especially so as it evidences an honest, highly cultured, highly intelligent mind that is in anxious pursuit of the real and the true. The materials dealt with are not Mr. Calderwood's alone. They are the common property of the scientific world. For the physiological experiments and the anatomical data, and the illustrative facts of mental actions, Mr. Calderwood has had to turn to others, and frankly acknowledges his indebtedness in these regards. His second, third, fourth, fifth, and sixth chapters are occupied with the anatomy of the brain, cord, and peripheral nervous system, with the localization of functions in the brain, and the comparison of cerebral structures and functions in the lower and higher forms of animal life. The illustrations are judiciously selected and well executed, the style is clear and strong, and this part of the work would be highly instructive to many a one who prides himself on his special knowledge, and would furnish an excellent resumé for most medical men outside those specially interested in neurology. It can, therefore, be imagined how much information would be supplied by this part to the ordinary college or university student and teacher. The other ten chapters deal with the questions of animal intelligence, personal experience as conneeted with action of the sensory system, experience as connected with motor activity, memory, use of speech, action and reaction of body and mind, weariness, sleep, and unconsciousness, brain dis-

orders, the higher forms of mental activity; and throughout the same perspicuity and felicity of phraseology and happy presentation of matter. It will be evident from this hasty summary of contents that the anatomist and the physiologist has cleared the way for the metaphysician; that abstruse speculations, dependent on one's own personal consciousness of the actions of the mind, conjoined with that evolved from the like experience of others, have been checked by the results of objective experimentation.

But in spite of these many merits, a kindly critic would have done him good service who should have overlooked Mr. Calderwood's MS. before its publication, and returned it to him with Pope's couplet on the back:

> " A little knowledge is a dangerous thing;
> Drink deep, or taste not the Pierian spring!"

He has undoubtedly shown considerable aptitude in versing himself in his subject; but he has fallen far short of making himself master of it. Thus he has entered with much detail into Ferrier's experimentation upon the brains of animals, and the subsequent investigations of the New York committee and those of Carville and Duret; and yet he has no reference to the later and extremely important experiments of Munk, or the pathological data bearing upon localization that have been gathered in by so many different observers. Nor are his anatomical studies of the brain by any means profound. In them no attempt whatsoever is made to treat of that accurate and intimate structure of the brain which, thanks to that peerless cerebral anatomist, Meynert, is now within the reach of any one who will read German, or have it translated for him, and who will then take the time necessary to a proper study of the subject. We are perfectly aware that the vast English-reading public of America and the British kingdom want books that are readable, even when they treat of such abstruse subjects as brain and mind. We are far from deprecating this feeling of the public. On the contrary, we hold it to be an admirable check on diffuseness and slovenliness of style. It says to each writer, " Come to the point; don't waste words." A healthy growth of this sentiment on the eastern bank of the Rhine would be eminently salutary in diminishing the awkwardly worded and lengthy pedantry which is so apt to render German articles on science tiresome to read. Nevertheless, thoroughness should never be sacrificed to brevity and elegance. It is possible to combine all three. It is only the combination of all three that makes the highest

standard. And it has yet to be proved that such of the vast English-reading public of America and the British kingdom as will read a book like Mr. Calderwood's, will not also read the same book when it contains the twenty or thirty pages more that may be necessary to accurately describe the more minute anatomy of the brain, the more especially when this addition will enable the reader to gain much more intelligent comprehension of mental action. Whether, therefore, this omission has been purposive or inadvertent, we must deem it a defect. When we turn to Wundt's splendid work, "Grundzüge der physiologischen Psychologie"—with which, by-the-by, Mr. Calderwood seems to have no acquaintance, a fact made the more singular by his frequent reference to other German authors—the contrast is very striking in this respect, although the date of publication was 1874, nine years prior to Mr. Calderwood's. The Scotch professor has plates illustrative only of those gross anatomical details which are the stale stock-in-trade of so many English and American publications, such as a plate to show the corpus callosum in a manner more diagrammatic than real, another to show the basal ganglia as one looks down on them from above after removal of the corpus callosum, etc. The German professor has a much greater number of plates, carefully drawn from nature, to display the deeper structure and the plan of that structure. Singular to say, too, we have a remarkable exemplification furnished unconsciously by Mr. Calderwood himself, as to the necessity for this exact knowledge that so often seems superfluous. Thus our author reaches the conclusion that, because the convolutions in the brain of the elephant and the whale are so elaborate and complicated, quite as much so, he thinks, as in the human being, therefore the convolutions are not a reliable guide to the intelligence of the organism in which they are found. No knowledge is displayed of the fact that it is not the elaboration and complication of the convolutions which serve as a criterion of higher intelligence, but rather the particular method of arrangement. In the brains of the whale, the elephant, the fox, and, indeed, the mammalia generally, the convolutions curve crescentically over and above the fissure of Sylvius in a smooth and symmetrical manner, whilst in man the central portion of these convolutions, that portion which, roughly speaking, comprises the motor area of the cortex and the cortical regions bordering before and behind, assumes a much more complicated structure. The brain, therefore, of an elephant or a whale, beautiful and elaborate though its convolu-

tional arrangement may be, is in intellectual type below that of the ape, or even of the half-ape.

Mr. Calderwood's mind seems to be in continual strife with itself in trying to resist the conclusions which facts would force upon it. He would have his reader believe that intelligence is not in proportion to brain structure, and, to maintain this, meanders through a long disjointed argument, composed partly of fact, partly of mistakes in fact, partly of unwarrantable conclusions. In the first place, we have a very pleasant and interesting description of the wonderful things the ant can do; how it organizes its community; how it stores its seeds, puts them in the sun to dry, takes them in when the weather threatens; how its warrior-ants march and countermarch; how the aphides or milch-cows are regularly stroked for their honey; how slaves are kept by one species; how some carry on agricultural operations. We are next taken into the privacy of the home-life of the chick, and told how quickly after birth it will unerringly make a stroke at a fly and swallow it, or run without hesitation or stumbling after its mother or the duck or the human being that had been imposed upon its unsuspecting nature as its mother. The dog comes next, then the horse, and many interesting anecdotes are given of their intelligence, upon which, we take it, it would be needless to dwell, and the list is completed by consideration of the sagacity of the monkey, the ape, the elephant, and the whale; the last one, of course, being an almost entire stranger to man. Mr. Calderwood arrives at some strange conclusions regarding these creatures. He thinks that "the ant is superior in intelligence to the ox, and the dog to the horse, and both ant and dog are superior to the ape." Again: "The ant is more intelligent than the bee." These are certainly rather startling propositions, much more easy to make than to refute. It is, therefore, Mr. Calderwood's bounden duty to conclusively prove these assertions, and until he has done so, no one is called on to refute them. This is a simple little proposition, by-the-by, which is apt to be overlooked by the scientific world. What are Mr. Calderwood's data of proof? Let us take up the above propositions *seriatim*. First, as to the ant being superior in intelligence to the ox. The ant is certainly intelligent when it can do all the various things which we have spoken of above. An ox who could take care of seeds as carefully as the ant does, who could milk cows, who could cut down grass, who could march and countermarch, would certainly be a great prize to Barnum's Greatest Show on Earth, and one live ox would provide more meat for discussion than do thousands of dead kine. But is

it a fair test of intelligence to contrast a minute creature like an ant, living in its peculiar environment, with a huge creature like an ox that has its existence in such different surroundings? Would it be fair to call the ant stupid because it cannot chew a cud, or whisk off flies with a long tail, or bellow, or recognize the person who feeds it? Is it not more fair to ask as to which shows the most intelligence in regard to its needs, and take also into consideration that the ant has never been domesticated, while the ox has, so that the former displays, in full activity, the myriad instincts which are necessary to its independent and undomesticated existence, and the latter has many similar instincts held in abeyance by the centuries of dependence of its race on human guidance? Mr. Calderwood details this interesting bit of information upon the authority of Sir John Lubbock:

"In one case when the ants were in full activity, he opened a chasm of half an inch on their road home, which had either to be crossed, or a roundabout course of seven feet had to be taken over sticks laid for them. Though the ants reached over, and showed a great anxiety to take this short cut home, none of them faced the leap, but all went round by the sticks. . . . Again, larvæ were placed in a cup, on a slip of glass, surrounded by water, but made accessible to the ants by a paper bridge. This bridge was drawn back a little, so as to leave a chasm they could not reach across. It did not occur to them to push the paper bridge, and after a quarter of an hour's attempt, they gave it up." Imagine, now, if our kind reader please, an ox in a pasture. Imagine some Sir John Lubbock suddenly sinking before the homeward-faring ox a chasm of about thirty feet, which would bear to the size of the ox about the same ratio as the half-inch chasm bore to the ant's size; while, about an hundred feet away, a bridge had been thrown over this chasm. Or imagine a rich pasture islanded in a body of water, and made accessible only by a bridge which needed shoving to reach from the mainland to the island. It there aught to make us believe that oxen would not act as intelligently in those dilemmas as the ants did in their similar ones? As Mr. Calderwood does not mention that he has attempted to familiarize himself with the sagacity of the ox as he has with that of the ant, there is nothing to prove that the ox would not have acted more intelligently than the ant upon these occasions. We are thus forced to the conclusion that Mr. Calderwood does not prove that the ant is superior in intelligence to the ox.

The second proposition is that the dog is more intelligent than the horse. The great obstacle in the way of acceptance of this

statement is to be found in the fact that the horse has been by no means as well observed or as well taught as the dog. We keep a dog about us. He lives in the same house, often in the same room with us. He is a veritable companion. But the horse is only used at certain intervals, and then in harness, "cribbed, cabin'd, and confined." Even though it may happen, as on the frontier or in the army, that the horse approximates in companionship to the dog, yet these are comparatively only exceptional instances, and the habits thus engendered by companionship are not hereditarily transmitted or trained carefully from generation to generation.

The next proposition is still more astounding. Ant and dog superior in intelligence to the ape! It comes upon us like the apparition of Hamlet's father on the ramparts of Elsinore. "*Angels and ministers of grace defend us!*" Mr. Calderwood tells us of the orang-outang which Buffon possessed. The animal was grave and sad in demeanor. It would walk to the door of the room, offer its hand to entering guests, and conduct them to a seat. It would gravely walk around the room with these guests, as they promenaded, admiring the pictures, etc. It would take its seat at table, unfold a napkin, lay it across its lap, wipe its lips, touch its glass to the glasses of others, use its knife and fork. And this intelligence is deemed inferior to that of the dog and ant! We frankly confess our inability to comprehend how any such conclusion could have been reached, except upon some such parity of reasoning as that of a recent lunacy commission, which sapiently announced that a notorious maniac of kleptomaniac tendencies was not insane, but only weak-minded.

Throughout the book the same confusion of thought prevails in other matters. The author labors hard to draw a distinction between instinct and intelligence, and yet he is constantly speaking of instinct as intelligence. His elucidations of the distinction are by no means lucid. Let us listen to some of them. Speaking of animal intelligence—as he terms it—as distinguished from instinct, he says:

"The essential distinction between these two appears in its simplest form in the contrast between outward observation and intended impulse to action. The difference may be illustrated by the dog watching the approach of his master, and turning round and round before he lies down. Towards the interpretation of this difference, it will be helpful to notice as a preliminary fact that the one is connected more obviously with the motor system, the other with the sensory. . . . Instinctive action originates from

within, having its rise determined by certain conditions of the organism, just as visceral excitation leads to muscular activity, for it is true, as Mr. Spencer says, that instincts 'occur only among the actions of that nervo-muscular apparatus which is the agent of psychical life.' Actions illustrative of animal intelligence are such as depend on sensory impressions made upon external organs of sense, and more commonly through the special senses."

Let us reduce these propositions to more simple shape. At the outset, we are in doubt as to whether Mr. Calderwcod believes the brain alone, or the brain and the spinal cord together, to be the recipient of these various impressions. We will assume, however, that he means the brain. The brain, then, receives two sets of impressions—one from within, along the nerves of the sympathetic system; the other from without, along the peripheral nerves of general and special sensation. The reflex cerebral action set up by the first set of impressions is arbitrarily dubbed instinct by Mr. Calderwood, whilst that produced by the second set of impressions is, with equal dogmatism, called animal intelligence. When the dog squirmed and howled from the pain of colic, therefore his action would be instinctive; but when he squirmed and howled because he was beaten, his action would be intelligence. If Dr. Otis cut a stricture in the dog's deep urethra, his attempts to get away would be instinct. If Dr. Otis slit his urethral meatus, however, his attempts to get away would be intelligence. Mr. Calderwood himself was evidently not quite satisfied with these definitions, for he immediately goes on to make use of this very contradictory language:

"But the distinction is difficult to maintain clearly, a difficulty readily appreciated if two facts are considered, that all sensory impression from without tends naturally in animal life to pass over into action; and that repeated impressions when thus associated with motor action produce an organic change in the cerebral organ, and by hereditary transmission pass over into the region of instinct."

If this means anything, it means that impressions coming at first to the brain along the peripheral nerves of general and special sensation may, when often repeated, produce an organic change in that brain, and then, by hereditary transmission, travel to that same brain along the sympathetic nerve-fibres. Thus, if a dog's ancestors had squirmed and howled from repeated beatings, hereditary transmission would make the dog himself squirm and howl, because he felt the beating in his internal viscera—a sort of scriptural yearning of the bowels.

With these associated and interwoven defects and merits, and many others of a like kind, we commend the book to our readers —not as a guide, not as by any means infallible, but as readable, thoughtful, suggestive, and containing errors that can readily be corrected in future editions. L. C. G.

UEBER DIE URSACHEN DER ERKRANKUNGEN DES NERVENSYSTEMS. Antrittsvorlesung, gehalten in der Aula der Universität am 13. Februar 1884, von DR. ADOLF STRUEMPELL. Leipzig.—ON THE CAUSES OF DISEASES OF THE NERVOUS SYSTEM. An Inaugural Address before the University of Leipzig.

Prof. Struempel has long been recognized as one of the most able writers in the department of "Innere Medicin." This inaugural address, which displays an acuteness of observation and a power of generalization rarely combined in one man, will go far to establish his position in the first rank of authorities upon nervous diseases. It deserves to be widely known, and no apology is necessary for giving an extended analysis of it in this JOURNAL.

The subject is introduced by a review of the three stages of development of medical science. These are the stage of the study of symptoms, the stage of the study of pathology, and finally the stage of the study of the causes of disease. In the study of nervous diseases, the first two stages have been passed. Struempell is the first to proceed to the consideration of the last stage. He admits that isolated causes have been ascribed to various nervous maladies, but says that the subject of etiology has never received the attention in this department which it has in others.

Excluding such causes as traumatism, embolic processes, hemorrhages, or tumors from consideration, he enters at once upon the study of "system diseases."

There are certain diseases of the nervous system in which the limitation of the lesion to definite parts seems to be determined by the anatomical arrangement and physiological function of those parts. Certain diseases affect certain definite tracts alone. Anatomical relations alone, or the distribution of blood-vessels, do not afford sufficient grounds for explaining this limitation. We are obliged to seek its cause in the physiological independence of each tract. It is well-known that a physiological process, when carried beyond a certain point, may give rise to a form of disease which may be ascribed to an excess in the intensity or rapidity of the normal nervous excitement, and which may result in permanent disturbances of nutrition. An example of this may be found in any

one of the "*occupation-neuroses*," writer's cramp, pianist's cramp, etc., all of which are due to an overtaxing of a natural power, and all of which are functional diseases. A similar cause may, however, be assigned to certain other diseases, not functional merely, in which a definite independent physiological tract is affected. Such are the diseases which are classed under the term "*primary atrophic degeneration of the motor tracts*." This term is not to be limited to *amyotrophic lateral sclerosis*. The motor fibres from the pyramidal columns are traced directly into the large ganglion cells of the medulla and cord. Hence, *progressive muscular atrophy* and *chronic bulbar paralysis* which are diseases of the terminating portion of the motor tract are to be included in this class. And, as a matter of experience, it is well-known that, in many cases of these diseases, the first symptoms have appeared after a severe and unusual muscular effort. The demand made upon the normal powers of these parts has been so excessive as to produce great exhaustion, permanent disturbance of nutrition, and actual destruction of tissue. The process may not be fully understood; but it is known that, coincident with every physiological act, there is a chemical change in the functioning cell, an accumulation of certain necessary material, and an excretion of waste products. It is not difficult to conceive of a disturbance of this process, too rapid accumulation, an imperfect nutrition, or a defective excretion, which will, of necessity, be limited to the parts which are by the physiological effort brought into action. There are, of course, many cases of these diseases in which no such overexertion can be ascertained to have occurred. There are cases in which the disease beginning in one part extends to other parts—a fact which raises the question whether an overexertion of one part may predispose other parts to disease. While, therefore, the physiological process carried beyond normal limits may be taken as one of the causes of system diseases, it is not to be affirmed as the sole cause.

A second cause of system diseases is to be found in hereditary predisposition to nervous disease. Such hereditary predisposition has long been recognized as a cause of many functional diseases, *nervousness*, *neurasthenia*, for which no anatomical basis has been found. It is also to be regarded as a cause of organic diseases, diseases which are to be ascribed to a defective development in fœtal life of certain definite nervous tracts. It is known that each tract has its own period of development and a definite time for receiving its medullary sheaths. That certain of these tracts may fail to attain a normal state is now proven by the existence of certain dis-

eases which appear early and are evidently due to congenital causes. It is especially in regard to these that hereditary predisposition may be asserted as an etiological factor. Such are the *hereditary form of ataxia* described first by Friedreich, the *juvenile form of muscular atrophy* (so-called pseudo-hypertrophy), and the recently recognized disease known as congenital *myotony* or Thomsen's disease. This cause of disease is not to be affirmed indiscriminately and can hardly be traced in those affections which develop late in life.

A third cause of system diseases is to be sought in external influences, which have a special power upon definite parts of the body.

The first of these is the introduction of poisonous substances which affect distinct parts of the nervous system. There are many drugs which exert an influence, not upon the entire nervous system, but upon special portions of it. Strychnine excites the reflex centres of the cord. Curare paralyzes the ends of the motor nerves. Morphine throws the sensory apparatus out of action. Atropine affects the vaso-motor and secretory functions.

Clinical experience shows that this is true of many substances not used as drugs, but entering the system by accident, substances whose accumulation leads to well-marked anatomical changes, not diffuse, but limited to certain tracts. *Lead paralysis* is an example of a disease produced by an external agent acting with a selective influence, not merely upon the motor system, but upon a definite set of motor cells in functional connection with the muscles of the arms. This is not the only example. Some years ago, the physicians of Marburg had an opportunity to examine a large number of cases of *poisoning by ergot*. Not only were the symptoms in many respects identical with those of locomotor ataxia, but the lesion was found to be limited to the posterior columns of the cord, and to resemble in all particulars that of tabes. Here, then, it is evident that a certain system of fibres, to the exclusion of all others, can be affected first by a disturbance of function, and at last by an actual destruction of tissue by means of a definite poison. Another equally interesting series of observations has been made by Italian physicians. In some parts of Italy, a peculiar epidemic disease has been traced to the use of Lathyrus beans, which the poorer classes mix with flour in making their bread. The symptoms of this disease (*Lathyrismus*) resemble those of spastic paralysis, disturbance of motion, increased patella tendon reflex, etc. And although no autopsies have as yet been reported, the symptoms indicate a lesion limited to the lateral columns of the spinal cord.

As is well-known, an attempt has been made to bring *locomotor ataxia*—the chief system disease—into a causal relation with syphilis. The greater the care of observation, the more probable does it seem that at least a very large number of cases of ataxia have been preceded by a syphilitic infection. The view that syphilis establishes a "disposition" to spinal-cord disease is less tenable than the hypothesis that the syphilitic poison has a specific action upon certain tracts in the nervous system, viz., the posterior columns of the cord. The supposition that syphilitic poison is an organized germ does not contradict in any way this hypothesis. For it has just been shown that ergot has a similar specific action upon these columns, and the action of ergot is due to the vital activity of a germ which it contains.

This leads to a consideration of the subject of the influence of germs in the production of nervous diseases. The necessity of considering the question is forced upon us by the facts recently discovered which have led to a revolution in the subject of etiology in so many diseases of other organs. Local diseases of distinct organs, as well as contagious and infectious diseases, are now being traced to the presence of germs. May nervous diseases be due to the same cause? It has long been known that certain affections of the nervous system, epidemic spinal meningitis and lyssa, were infectious. These we will pass by, as well as syphilitic and tubercular diseases of the brain and cord, which are only distinguished from similar germ diseases elsewhere by their localization.

Reviewing the field of nervous diseases from this standpoint, there is a group of diseases whose symptoms and course have a certain resemblance. There are *acute multiple neuritis*, *acute poliomyelitis* and an unfamiliar form of *acute encephalitis* of children. These all begin suddenly with high fever, are characterized by headache, digestive disturbances, enlargement of the spleen, and often by swelling of the joints, and moderate albuminuria, symptoms which all point distinctly, according to our present opinion, to the infection of the body by an organic poison. In their course, these diseases also agree. The same variation in symptoms, the same progress of the disease, is found in neuritis and poliomyelitis, and although the distribution of the paralysis may be various, the common feature is recognized of a disease of the motor system. In fact, these three diseases appear to be varieties of one disease which has a single origin, and by means of their etiology are to be brought into relationship. Neuritis and poliomyelitis stand to one another now as formerly croup and diph-

theria stood, and just as it has been found that the latter are one in origin, and have numberless intermediate varieties, so is it probable that a similar connection may be established between the former. This view of the etiology of these diseases is supported by the well-known fact that somewhat analogous affections often appear as sequelæ of general infectious diseases. The common nervous sequelæ may be referred to a late development of the specific germ of the original disease in some part of the nervous system. Examples are the *nervous sequelæ* of *diphtheria*, *typhoid*, *small-pox*, etc., and the *chorea* which follows acute rheumatic fever or ulcerative endocarditis. The latter cannot be distinguished from idiopathic chorea, and this raises the question whethor *idiopathic chorea* may not be of micro-parasitic origin. A more striking example of a nervous disease due to a germ is afforded by trigeminus neuralgia of malarial origin, and a similar explanation may be found for many other so-called "idiopathic" or "rheumatic" neuralgiæ.

There are numerous peripheric nervous affections whose relation to infectious processes is probable. Rheumatic, facial, or deltoid paralysis, as well as herpes zoster, may here be considered, the latter being known to occur in the form of an epidemic.

Among other diseases which have hitherto been known as "general neuroses" without ascertained cause, and in which the hypothesis of a germinal origin is not unwarranted, is *tetanus*. Its resemblance to lyssa has led to this hypothesis, and when it is remembered that tetanus may occur as an epidemic among the wounded after a battle or in a hospital; that its appearance seems to have a relation to atmospheric and hygienic conditions; that its origin, like that of erysipelas, is frequently traumatic; that its course and symptoms are such as resemble in many points other infectious diseases, the hypothesis is seen to have much in its favor.

These examples demonstrate that external influences, drugs, poisons, living organisms may enter as important factors in the causation of nervous diseases. And it scarcely needs to be pointed out that this view of the etiology opens a broad way to rational therapeutics, as well as affords a satisfactory explanation of the success of quinine, salicylic acid, etc., in the treatment of certain neuralgiæ, and of arsenic in that of chorea.

The consideration of the causation of nervous disease would not be complete without a mention of the influence of mental excitement. Daily experience convinces us of the interaction of mind and body. The face flushes with rage, or pales with fear;

the body trembles with horror; the heart beats and the breath is held with excitement; and a great mental exertion may make the body insensible to physical pain. From these ordinary occurrences the progress to pathological changes may be continuous; and a permanent physical change may remain as a result of excessive mental strain.

We are, then, justified in classifying mental excitement among the causes of nervous disease. The action of this cause is evident in many functional troubles, *e. g.*, in laughing or crying fits of hysteria, or in nervous dyspepsia; or in nervous palpitation; or in insomnia. It may be discovered in those cases of "nervous joints" in spastic contraction or paralytic relaxation which are found to occur after a sudden fright in nervously excitable children or females.

The entire range of hysterical and hypochondriacal affections find a place in this category of causation, and are none the less to be studied because our present methods have failed to reveal their anatomical basis.

It is more difficult to answer than to ask questions regarding the etiology of disease. But the questions stimulate to research and to study. In a systematic investigation of any scientific subject, it is a distinct gain to arrive at the interrogation point; and in closing, the hope is expressed that in the near future the study of nervous diseases will enter upon its final stage—the stage of the knowledge of causes.

Professor Struempell's address loses much in the process of translation and condensation. It should be read and studied by every physician, as a most original and suggestive contribution to the knowledge of nervous disease. M. A. S.

PLAN DES MENSCHLICHEN GEHIRNS. Auf Grund eigener Untersuchungen entworfen von Dr. PAUL FLECHSIG. Leipzig, July, 1883.—A MAP OF THE HUMAN BRAIN.

With the object of presenting in an accessible form the result of his recent researches in the anatomy of the brain, which have been published from time to time in various journals, Flechsig has issued this pamphlet, containing a concise and complete statement of his discoveries, and a diagram of the principal nerve tracts. Inasmuch as it is now conceded that the method of Flechsig surpasses all others in the accuracy of its results, his statement is worthy of attention. The conclusions presented by him are based partly upon facts gathered from the study of the development of

the nerve-tracts in the embryo, and partly upon those afforded by the investigation of secondary degeneration after limited lesions, and partly upon the results of the examination of a brain in which the cerebellum was entirely absent.

They are as follows:

I. There exist direct nerve-tracts between the cortex of the cerebrum and the motor and sensory nerves.

1. The direct motor tract arises from the cortex of the anterior and posterior central convolutions, of the paracentral lobule, and of the parietal lobe as far back as the præcuneus. Its anterior limit of origin is the sulcus præcentralis. Its posterior limit is not fully determined. The greater part of this direct motor tract is formed by the "pyramidal tract," which joins the cortex with the motor nerves of the body and which forms the pyramid of the medulla. Lying anterior to this tract in the centrum ovale and internal capsule, and internal to it in the crus cerebri, is the smaller part of the direct motor tract which connects the lower division of the anterior central convolution with the nuclei of the facial and hypoglossal nerves in the medulla. As this smaller part does not reach the pyramid of the medulla, it is not included in the "pyramidal tract." This direct motor tract has no connection with the basal ganglia nor with the gray matter of the pons. In the internal capsule it occupies the middle third; in the crus, the median portion of the outer half; in the medulla each tract divides into a large crossed pyramidal tract which decussates in the lower decussation, and lies in the posterior part of the lateral column of the cord, and a small direct pyramidal tract which lies in the anterior median column of the cord. In the cord the individual fibres leave the tracts at various levels and pass into the gray anterior horn of the side on which they lie, there entering the large multipolar ganglion cells. The majority of the pyramidal fibres end in the two enlargements (cervical and lumbar) and thus are in physiological relation with the nerves of the extremities.

2. The direct sensory tracts are less accurately determined.

The *olfactory* tract, on leaving the olfactory bulb, divides into

a. A branch to the base of the frontal lobe, to the gyrus fornicatus (?);[1] the inner root.

b. A branch to the cortex of the sphenoidal lobe, to the gyrus uncinatus; the outer root.

c. A branch which passes backward through the lamina perforata

[1] The question marks are inserted by Flechsig to indicate that the statement is hypothetical.

anterior (to the internal capsule and "carrefour sensitif") (?); the middle root.

The *optic* tract, made up of fibres from both optic nerves, after leaving the chiasm and passing around the crus, sends (*a*) the larger number of its fibres into the corpus geniculatum externum; from which fibres in turn radiate outward through the posterior part of the internal capsule to pass to the occipital lobe. (*b*) The smaller number of its fibres pass to the anterior pair of the corpora quadrigemina. These fibres join the cells of the gray surface layer (Rindenschicht), and then turn back and pass over the corpus geniculatum externum to join the radiating fibres to the occipital lobe. The termination of these radiating optic fibres in the cortex is in the occipital lobe and especially in the cuneus, but with them are associated many fibres from the optic thalamus.

The *auditory* tract and the *gustatory* tract have not yet been followed.

The tract conveying sensations from the skin is not fully traced, and it is questionable whether it is a direct tract. Clinical facts indicate the following course as the most probable in the brain:

The tract conveying general sensations from one-half of the body passes through the tegmentum of the pons and crura of the opposite side (Grosshirnschenkelhaube) into the posterior part of the internal capsule, which lies between the pyramidal tracts and the corpus geniculatum externum; thence radiating, its fibres pass to the cortex of the cerebrum lying between the sulcus præcentralis and the occipital lobe, *i. e.*, to that part of the brain which is situated beneath the parietal bone.

II. There exists a system of nerve tracts in connection with the optic thalamus.

1. From the external surface of the optic thalamus nerve fibres pass outward in all directions, forming the corona radiata, and joining the thalamus with all parts of the cortex. The cortex of the frontal lobe is joined with the thalamus by means of fibres which pass through the anterior part of the internal capsule, and go to the anterior outer nucleus of the thalamus, and to the stratum zonale. The parietal cortex in its entire extent is joined with the thalamus by fibres which pass to the outer and inner nuclei and to the stratum zonale. The cortex of the temporo-occipital lobe sends a large bundle of fibres to the pulvinar (the outer posterior third) of the thalamus, and to the stratum zonale. The cortex of the Sylvian region is joined with the outer and inner nuclei of the thalamus and with its stratum zonale. The cortex of the hippocampal region is joined to the

anterior outer nucleus of the thalamus by means of the fornix, which passing from the hippocampus, along the roof of the lateral ventricle, and then downward to the corpus mamillare, there turns upon itself and ascends to enter the lower surface of the thalamus. The lenticular nucleus sends fibres through the internal capsule to the basal portion of the thalamus, but whether these end there or pass on to the tegmentum of the crus, is undecided.

2. A second series of tracts connects the thalamus with the crus cerebri and its tegmentum.

(1) Vicq d'Azyr's bundle of fibres passes downward from the anterior outer nucleus of the thalamus to the corpus mamillare, there turns upon itself and some of its fibres go between the red nucleus of the tegmentum and the substantia nigra of the crus into the formatio reticularis of the pons, while the remainder join the fornix (as already described).

(2) Meynert's bundle is made up of fibres coming from the stratum zonale of the thalamus, from the ganglion habenulæ, and from the gray matter lining the third ventricle, which unite and pass through or near the red nucleus, are then connected with the ganglion interpedunculare of Gudden (?), and go downward toward the formatio reticularis of the pons, though they cannot be traced into it.

(3) From the laminæ medullares of the thalamus, especially from the middle third of the lamina medullaris externa, bundles of fibres pass down to the red nucleus of the tegmentum. It is questionable whether these come from the gray matter of the thalamus, or from the internal capsule; and whether they end in the red nucleus or pass on to the cerebellum by its superior peduncle. The latter hypotheses have much in their favor. The assertion of Meynert that they pass into the formatio reticularis of the pons is denied. The assertion of Wernicke that they form a part of the lemniscus is also denied. Their connection with the cerebellum is deemed probable, as they were absent in the brain in which the cerebellum was wanting.

(4) It is uncertain whether the fibres from the optic tract which enter the thalamus come from the optic nerve or from the commissura inferior of Gudden. It is possible that they do not end in the thalamus, but pass through it to the corpora quadrigemina.

III. There exists a system of nerve fibres in connection with the gray nuclei of the ventral half of the pons Varolii.

1. A tract from the cortex of the frontal lobe forms the anterior division of the internal capsule and passes downward through the

inner two-fifths of the crus cerebri to the gray nuclei in the antero-median substance of the pons. From these nuclei new fibres arise which pass laterally through the middle peduncle of the cerebellum to go to the lateral and posterior portions of the hemispheres of the cerebellum. All these fibres develop their medullary sheaths at the same time, and all of them were absent in the brain which lacked the cerebellum. It is, therefore, probable that by means of these fibres the cerebrum and cerebellum are brought into functional relation—the nuclei of the pons being interpolated in their course.

2. A tract from the postero-median gray nuclei of the pons ascends through the external fifth of the crus cerebri, forms the basal part of the internal capsules, passes along the base of the lenticular nucleus, and into the corona radiata of the temporo-occipital lobes. In the occipital lobe its fibres turn backward and are lost. In the temporal lobe they pass forward and can be traced to its apex. The nuclei of the pons from which this tract arises are joined, by deep lying fibres in the middle peduncle, with the superior part of the cerebellum lying near the median line. The fact that in congenital absence of the cerebellum these tracts were wanting, leads to the supposition that they, too, are connecting tracts between the cerebrum and cerebellum. This tract is not to be regarded as an auditory tract because it does not obtain its medullary sheath until three or four months after birth, long after the time at which an infant can first hear. The same reason prevents the supposition that it conveys sensation from the skin, although it is in this tract that Meynert and Gratiolet located the tract of general sensation. Clinical cases give no facts to determine the function of these tracts.

3. A tract connects the pons nuclei with the corpora striata. From the nucleus caudatus fibres pass into the laminæ medullares of the nucleus lenticularis, where they are joined by fibres from the outer body of this nucleus, and thence the two sets in one bundle pass downward into the crus and enter the substantia nigra of Sommering, forming the stratum intermedium of Meynert. Here a part of them are lost. The remainder pass onward, lying dorsad of the deepest transverse fibres of the pons, join the lemniscus in the middle of the pons and probably end in the nuclei of the pons (?) from which in turn new fibres pass to the cerebellum. This tract degenerates downward after lesions in the crus. Its function is unknown.

IV. There exist a number of important tracts in the tegmentum of the crura cerebri beneath the corpora quadrigemina.

1. The largest of these is the superior peduncle of the cerebellum (Bindearm). This tract arises chiefly from the nucleus dentatus of the cerebellum, which is in turn connected with the cortex of the cerebellum, and with the opposite olivary body by way of the corpus restiforme of the medulla. It arises partly from the cortex of the superior and middle portions of the cerebellum, and possibly from the nucleus of the auditory nerve. Passing upward from the cerebellum the superior peduncle disappears beneath the corpora quadrigemina, decussates and apparently ends in the red nucleus of the tegmentum of the opposite side. While the majority of its fibres do end in this nucleus, a certain number lying dorsad of it pass onward and then divide into two bundles. The first of these turns forward and outward, and forms a part of the pillar of the lenticular nucleus (Linsenkernschlinge"). The second turns upward and backward, passes through the internal capsule, and forms a large part of the corona of the tegmentum ("Haubenstrahlung").

2. The lemniscus forming the outer and ventrad boundary of the tegmentum is made up of two sets of fibres, one of which, including two-thirds of the tract, degenerates downward; the other, including the remainder, degenerates upward. The large part of the lemniscus is made up of fibres which have come from the interolivary tract, and which have a probable connection with the olivary body, and with the nuclei gracilis and cuneatus. These pass upward in the tegmentum external to the red nucleus, turn outward, go through the Luy's body and the internal capsule, and end partly in the lenticular nucleus and partly in its pillar. The smaller part of the lemniscus is made up of fibres which have come through the upper or sensory decussation from the posterior columns of the spinal cord, which have passed external to the greater part of the lemniscus in the pons, and which, at the level of the corpora quadrigemina posterior, turn upward and backward, and going through the posterior part of the internal capsule, form a part of the corona of the tegmentum. It is possible that through this tract sensory impulses pass directly from the posterior columns of the cord to the "carrefour sensitif." In the upper part of its course in the tegmentum, the lemniscus has numerous fibres associated with it which lie on its median side, and pass from the crusta to the tegmentum, and are lost in the raphé.

3. The posterior longitudinal bundle lies beneath the corpora quadrigemina in the tegmentum. It can be traced from the anterior columns of the cord (Vorderstranggrundbündel) through the medulla and pons, lying just beneath the gray floor of the fourth

ventricle near the median line. It passes beneath the corpora quadrigemina, then becomes small, and its fibres are lost in the gray matter of the third ventricle. Its individual fibres are of short course, and their function is to connect the various cranial nerve nuclei with one another. Between the nuclei of the III., IV., and VI. nerves it is of large size, since the fibres which join these nuclei, and convey impulses which produce conjugate movements of the eyes, are many.

4. Longitudinal fibres in the formatio reticularis. These fibres come partly from the lateral column of the cord (Seitenstrangreste), partly from the posterior columns of the cord, and partly from the corpus restiforme of the medulla. Many of them end in the gray cells which are scattered through the formatio reticularis, and from which new fibres arise. The area of the formatio reticularis diminishes from below upward, and from its upper extremity, at the level of the upper corpora quadrigemina, four distinct bundles of fibres branch out to pass on into the brain. These are as follows:

(*a*) The bundles of Vicq d'Azyr and Meynert, which pass to the optic thalamus (already described).

(*b*) Numerous fibres, to which are joined some of the fibres in Meynert's bundle and some in the posterior longitudinal bundle, which go to the central gray of the third ventricle.

(*c*) Many fibres which pass to the corpora quadrigemina anterior and :

(*d*) Fibres to the posterior corpora quadrigemina which either end in these bodies or join their brachia, and then pass onward into the corona radiata. The former (*c*) cannot be distinguished from fibres in the lemniscus, which pass to the corpora quadrigemina.

The connection of the tegmentum with the higher parts of the brain is formed by means of two large bundles, *each* of which is made up of fibres from *all* the various tracts in the tegmentum. One of these bundles is the pillar of the lenticular nucleus (Linsenkernschlinge), the other is the corona of the tegmentum (Haubenstrahlung). The first passes to the lenticular nucleus, the second to the cortex of the parietal lobe. Inasmuch as both bundles contain sensory fibres, it is probable that one centripetal impulse passes to both parts, awakening complex reflexes in the basal ganglion and conscious perception in the cortex.

V. The tracts in the cord can be traced into the medulla. 1. The anterior median and postero-lateral columns of the cord have already been traced to the pyramids. 2. The posterior median

and posterior lateral columns end in the nucleus gracilis and nucleus cuneatus respectively; the posterior median column being made up wholly of sensory fibres from the legs. From the nucleus gracilis fibres arise which decussate in the upper or sensory decussation, and pass partly into the interolivary tract, and partly into the olivary body. From the nucleus cuneatus fibres arise, some of which join those from the nucleus gracilis, and some go directly into the formatio recticularis of the same and of the opposite side. The continuation of the sensory tracts in the cord is therefore to be found in both the interolivary tract and in the formatio reticularis of the medulla. 3. The direct cerebellar column of the cord passes into the corpus restiforme of the medulla, and thence to the vermiform lobe of the cerebellum, where it decussates and ends in the cortex. To this column are joined in the corpus restiforme fibres which pass from the formatio reticularis, and from the olivary body of the opposite side to the nucleus dentatus of the cerebellum. It is possible that some of these fibres also go to the cortex of the cerebellum.

While the anatomical statements of Flechsig differ in some particulars from those of Wernicke, Forel, and Spitzka, these authors agree in regard to the course of the greater number of the tracts here described. The method of description of brain anatomy pursued by Flechsig is far more clear than the old method of describing successive sections at various levels through the brain. To follow a definite tract in its course and to learn its relations to other tracts and to the basal ganglia, is not only to secure a distinct picture of the structure of the brain, but also to aid one materially in any attempt to localize a disease in that tract. The results of Flechsig may be acceped as the outcome of careful research by means of an original and trustworthy method of investigation. His presentation of the subject of brain anatomy in this concise but complete little work will prove of immense service to those who are laboring upon this complex subject. M. A. S.

EDITORIAL ITEMS.

The Double Number of the Journal.—Owing to the contemplated sojourn of a greater part of the editorial staff in Europe, during the summer, the July number will not appear during that month, but be issued jointly with the September number. The double number resulting from this fusion will contain the following articles now in the hands of the editors, besides others which are promised, but not yet received: *Amelioration of Paretic Dementia Following Extensive Sloughing*, by C. B. Burr, M.D., Assistant Physician to the Eastern Michigan Asylum at Pontiac; *Cough as a Symptom of Disease, with Special Reference to its Nervous Mechanism*, by B. F. Westbrook, M.D.; *Analysis of a Case of Vertebral Caries Complicating Multiple Sarcomatous Degeneration*, by R. Mollenhauer, M.D.; *Architecture of the Brain*, by E. C. Spitzka, M.D.; *Mental Physics*, by S. V. Clevenger, M.D., Special Pathologist to the Cook County Asylum (Illinois); *Separate and Congregate Buildings for the Insane*, by Dr. Spray; *Brain Structure*, by M. A. Starr, M.D. Reviews on the following works crowded out of the present issue will accompany them: Harrison on Legislation for the Insane; Allen's Anatomy of the Nervous System; Burham on Medical Jurisprudence of Insanity; Clouston's Lectures on Insanity; and Strümpell's Text-Book on Internal Medicine, Part on the Nervous System. The Proceedings of the Society of Medical Jurisprudence and State Medicine will include articles by Landon C. Gray, M.D., on the *Medico-Legal Aspects of the Fillmore Will Contest;* by Henry Howard, on the *Reasons why Physicians and Lawyers Fail to Agree;* and by Dr. J. G. Kiernan, on the *Dwight Insurance Case*. The editorial items, whose publication is commenced in the present number, will be continued.

The editorial staff has been increased by the appointment of Drs. M. Allen Starr and J. G. Kiernan as associate editors.

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The Belt Sensation in Spinal Diseases.—A writer in the *Berliner Klinische Wochenschrift*,[1] Müller, endeavors to explain the cincture feeling and analogous sensations by the assumption of a vaso-motor disturbance. He bases this view on the well-known fact that a cincture feeling often accompanies hemicrania, and that a subjective sense of coldness accompanies many of these paræsthesias, and supposes that the slighter vascular injection of the affected districts causes the tissues in shrinking to press on the nerves and thus to produce in the nerve-end apparatus the feeling of constriction. This is a remarkable theory which may have a limited application in some functional complaints, but certainly fails to meet the case of locomotor ataxia or myelitis. A much more reasonable explanation, in our opinion, is the following: In a complete or incomplete transverse lesion of the spinal cord, the disturbed sensation in the parts innervated below the seat of the lesion contrasts with that in the parts innervated from the healthy, or nearly healthy, part of the cord, very much as the sensation of a part of the forearm immersed below the surface of a cold fluid differs from the sensation of the part not submerged. In the latter case, the most marked subjective feelings are not over the submerged area, but *on the border-line of greatest contrast.* So it is in spinal lesion; the border-line between the anæsthetic and paræsthetic region on the one hand, and the healthy area on the other, is subjectively most prominent.

If we assume that, where the transition of the healthy to the diseased region is sudden, the belt must be correspondingly sharply defined, and faint or not felt at all where such transition is gradual, and we can understand the variability of this symptom in ascending affections, and its greater distinctness in some than in others. E. C. S.

Curious Ventricular Granulations.—Pathologists are familiar with the round, wart-like granulations of the ventricular endyma, so common in advanced cases of paretic dementia, syphilitic brain trouble, and with hydrocephalic and chronic meningitic processes. Usually quite transparent, especially when of rapid formation, they are of a roundish form, rarely coalescing, sometimes elongated, and club-shape, but presenting the common character of being nodular. We have recently observed an unusual condition in perhaps the most extreme instance of this change which has been recorded. The subject was a private patient, and had been under observation some time for syphilitic

[1] 1883, Nos. 31 and 32.

cerebral trouble. At the time of the autopsy, the ordinary form of these granulations was found in the lateral ventricles, particularly about the foramen of Monro, and in the anterior half of the fourth ventricle. In the posterior portion of the latter, instead of the warty granulations, there was an immense hypertrophy of the endyma obliterating entirely the *alæ cinereæ* and *albæ*, as well as other surface marks, and on this general under-growth there were large ridges, from which lesser ridges radiated like the legs of a spider. A detailed description will be furnished, in connection with a monograph, on the subject, which is in course of preparation. E. C. S.

The Brain of the Amphiuma.—Osborne, of Princeton, has recently made some studies on the brain of this interesting urodelous amphibian. According to his description and figures, the brain of this animal bears a striking resemblance to that of the *menobranchus*, a member of the same class. Like the latter, it has no median furrow in the mesenephalon, so that there is but a single optic lobe. The writer, in speaking of the lack of differentiation at the base of the brain, says that the medulla (as in other amphibia) passes without clear demarcation into the *crura cerebri*. The latter term should not be used in this connection ; the amphibia have no true *crura cerebri*.

Professor Osborne notes that there is no clear decussation in the *chiasm*, as in the frog, and that the nerves are given off "as two slender fibres on either side of a slightly raised whitish plate." We have not been able to trace the nerves to the optic lobes in the *menobranchus*, and suspect that a similar relation obtains generally in the degenerated *urodela* that is found in the *cyclostomi*. It appears that there is no clear demarcation between the rhinencephalon and the cerebral hemispheres ; a feature in which menobranchus agrees with amphiuma. Another curious feature is identical in the latter with one we have observed in the former animal ; the pineal gland is a rich plexus of blood-vessels. Instead of saying, as Professor Osborne does, that "the structure of this body is nothing more than a rich plexus of blood-vessels produced from the choroid" (evidently meaning the choroid plexus of the lateral ventricles), we should say that the pineal gland itself had undergone an intimate union with the tela choroidea, and that the lateral choroid plexuses branched *from* this conjoined body, as shown in a figure we published a few years ago.

The writer under consideration speaks of a sort of "short superior median cornu" in the lateral ventricles. The ventricular

spur in question exists also in the menobranchus, but scarcely merits the designation of a "cornu." As described for *amphiuma* by Osborne—and this also applies to *menobranchus*—there is an extension of a cellular accumulation, and a deeply staining molecular substance in the cerebral wall, encroaching upon the surface ependyma in the direction of the spur. In the *menobranchus* there are other such developments.

The histological notes are brief. Osborne has been unable to trace the nerve fibres to any cell. This is alone the case in menobranchus, except in the cord and oblongata. He appears to have been unacquainted with the researches of Schmidt, of New Orleans, on amphiuma, and of Spitzka on menobranchus, which were specially directed to this point. There is a very pretty arrangement of fibrillæ in groups divided as obliquely cut fasciculi and cells, in transverse sections (reminding one of the olfactory glomeruli in mammals), in the olfactory lobe of menobranchus, and it appears, judging from the excellent plate accompanying Osborne's paper, that a similar arrangement is found in amphiuma. The description of the amphiuma's brain is very clear, and Professor Osborne's examination of the external and internal morphology seems to have been exhaustive and thorough. E. C. S.

Syphilis and Tabes Dorsalis.—The disputed question of the etiological relation of syphilis to locomotor ataxia, was brought before the Academy of Medicine in an able paper, read by Dr. Leonard Weber. The author seemed to incline against the extreme view advanced by Erb, and to occupy a middle ground. In view of the interest of the subject, we append a brief review of some of the leading historical facts related to the question, as well as of the discussion which followed Dr. Weber's paper.

At the eighth meering of the Neurologists and Alienists of south-western Germany, ERB reported in all on two hundred cases of locomotor ataxia, the first hundred of which formed the basis of his well-known earlier communication on the relation between syphilis and tabes dorsalis. Of the aggregate of 200 cases, 179 had had "chancres." Unfortunately Erb does not discriminate as thoroughly as he might have done between the non-luetic and true luetic sore, for he speaks of cases in which the primary sore was not followed by secondary symptoms. But making all allowances and deductions arising from this, his figures constitute a powerful argument in form of the luetic origin of tabes dor-

salis. In the last communication referred to,[1] he cites the following authorities who confirm his view:

Fournier, Rumpf, Voigt, Oehnhausen, and George Fisher. These writers found respectively 93, 66, 81, and 72 per cent of luetic tabetics. Of the ordinary invalid population, only $22\frac{3}{4}$ per cent had luetic antecedents, and the discrepancy of over fifty per cent at the lowest computation, can only be accounted for on Erb's assumption. That the latter is well founded seems to us indisputable, though it is stated too broadly in Erb's proclamation that "tabes dorsalis is probably a syphilitic disease whose outbreak is determined by certain accessory provocations."

At a meeting of the *Société médicale des Hôpitaux*, held November 10th, 1882, DESPLATS reported a case of locomotor ataxia in which antisyphilitic treatment had proven remedial, many of the essential symptoms of that condition disappearing altogether, and all showing amelioration.

Among those who have given important aid to Erb's position, RIEGER and FOSTER deserve prominent mention. In the conclusion of their important article on the relations of the spinal cord and the eye, they not only fully indorse his views, but go so far as to claim that the syphilitic ocular disturbances may be and often are mediated by a spinal disorder.[2]

Aix-la-Chapelle has long been a sort of Mecca for the luetic, and an enormous material for observation is annually accumulated here, and has not been altogether unutilized. REUMONT[3] relates that of 3,400 syphilitic subjects treated by him, 290 had syphilitic nervous affections, 100 being such of the spinal cord, and of these 40 tabetic. He thinks that it is difficult to say whether statistics will ever be able to decide whether syphilis is merely a predisposing or a direct cause, and admits that the two conditions may often merely coincide. That of thirty-six carefully observed cases, Reumont should report two as cured and thirteen as improved under antisyphilitic treatment, is, we think, a suggestive fact in favor of the Erb view. It seems to be so regarded by Reumont, for he advises a rigid antisyphilitic therapeusis in all cases where luetic antecedents can be established. It is worthy of note that Reumont's book is praised[4] as a dispassionate discussion of this mooted question by a leading authority.

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[1] Reported in "Neurologisches Centralblatt," 1883, No. 13.

[2] Auge und Rückenmark; Graefe's Archiv für Ophthalmologie, Bd. 27, iii., 188

[3] Syphilis und Tabes dorsalis nach eigenen Erfahrungen von Dr. A. Reumont. Verlag von J. A. Mayer, in Aachen, 1881.

[4] By Mendel, in his "Neurologisches Centralblatt" for 1882, No. 4.

In the discussion on Dr. Weber's paper, Drs. R. W. Taylor and R. W. Amidon took strong ground against the syphilitic origin of tabes. They grounded their objection mainly on the alleged fact that the syphilitic nervous lesions have specific syphilitic characters, and that none of these have been found in tabes dorsalis. No more faulty an argument could be advanced. Recent observations all tend to show that in syphilitic meningitis and the syphilitic arterial change—the two forms of syphilitic nerve lesion emphasized by both speakers named—there is no structural feature which is not also found in ordinary meningitis and ordinary non-syphilitic arterial changes.[1]

Dr. Birdsall's objections to the syphilitic origin of tabes were more logical; they were based on a criticism of Erb's too ready acceptation of alleged pre-existing syphilis, but went too far in another direction, inasmuch as the figures of a special clinic which were cited by him were much too small. In fact, many a practitioner has a larger number of cases in his private practice than were derived from this clinic.

One consideration was advanced by another speaker who sustained the existence of an etiological relation of syphilis which seems to have escaped the notice of all other debaters and writers. Finger[2] observed, three years ago, that that important symptom of posterior spinal sclerosis, *absence of the patellar tendon reflex*, is a frequent symptom of the secondary fever of syphilis in *ordinary* syphilitic subjects. So intimate is the relation of this fever to the disappearance of the knee-jerk that, when there is a relapse of the fever, there is a second disappearance of this reflex. It is certainly of the highest significance and illustrative of the vicious influence of syphilis on the nervous system that at so early a period of syphilis so pronounced a symptom of spinal disorder should be developed. As is well known, cerebral symptoms approaching the domain of mania are occasionally observed during the same secondary fever.

Some radical statements made by Dr. McLane Hamilton, who vigorously denied the existence of any relation of syphilis to locomotor ataxia, must be attributed to the influence of mental contagion. Up to the time when he took the floor, no one had said a word in behalf of Erb's view, and the drift of opinion seemed to be settling decidedly against it. That the speaker did not have his own experience and previous writings in mind when he spoke will be evident to all readers of the subjoined extract from Dr.

[1] Baumgartner, Psychiatrisches Centralblatt, 1878.

[2] See Abstract in AM. JOURN. OF NEUR. AND PSYCH., February, 1882.

Allan McLane Hamilton's "text-book," page 330, chapter xi. (title: Posterior Spinal Sclerosis): "Syphilis, as I have said, is sometimes at the root of locomotor ataxia, and perhaps the most fortunate cause to discover, as it greatly alters the prognosis of the disease." In his own table of eight cases, he assigns one out of the three whose cause was known to syphilis and exposure. No comment is necessary. E. C. S.

Horizontal sections of the brain isthmus are calculated to exhibit much more satisfactorily than the ordinarily made transverse and longitudinal sections, many ill-understood points in cerebral anatomy. Such sections, parallel as they are to the floor of the fourth ventricle, expose the topography of many nerve nuclei, such as those of the hypoglossal nerves, excellently well. The area occupied by some nerve roots, such as the facial and the raphé root of the fifth pair, strike him who is accustomed to estimate their dimensions from a study of transverse sections with surprise. The raphé root of the trigeminus covers an enormous area, and must, therefore, be a ribbon-like bundle.

The curious way in which the *genu facialis* curves around the abducens nucleus is also appreciated best from sections parallel with the ideal plane of the ventricular floor. Where the root overlies the posterior longitudinal fasciculus (nuchal and oculomotor tract), the latter seems to be flattened out and depressed, and the relation of the facial and raphe fibres are very much confused. It appears as if a distinct set of bundles emerging from the abducens nucleus enter the genu facialis. Whether they remain in it or leave the sagittal section to enter the posterior longitudinal fasciculus, it is impossible to say. In a sagittal section from the cat, the relation appears to be plainly that these fibres, rising towards the ventricular floor, join and accompany the descending branch of the seventh pair. This interpretation is opposed to Gowers' very positive declaration, and, if confirmed, constitutes an impervious obstacle to the unreserved acceptance of all the alleged results of the "atrophy method."

In sections taken in this plane, a sort of a rope-twist-like fasciculus (whether originally derived from the raphe or the posterior longitudinal fasciculus cannot be determined) runs cephalo-caudad and laterad to the descending section of the facial root. The abducens nucleus is seen to be fielded off into a basket-work pattern by sagittal and transverse myelinic fibres, which mostly pass through uninterruptedly.

There seems to be no doubt that an enormous contingent of facial fibres proceeds directly from the raphe, some fibres can be traced across the median line, and may establish either a crossed nuclear origin or commissural relation between the nuclei of both sides. Very probable is the first view, for the crossing fibres come from the ascending section of the genu, and appear to pass into the sagittal division of the opposite side.

One of the prettiest features of these sections is the anatomy of the trineural fasciculus (*f. teres* "solitary bundle.") Its origin from the piniform decussation is evident. The fibres are mostly fine, but there is a core of coarser ones, which give the finely stained root here and there a lighter appearance. One fasciculus contributing to it, can be traced cord-wards on the same side, but is lost in the level of the decussation. E. C. S.

The Buffalo Insane Asylum.—We are in possession of the annual report of the State Asylum at Buffalo, and we must confess that its perusal has given us great satisfaction. That the lunatic asylums of the United States are in great and crying need of medical reform has been often stated as an opinion. But we have always thought that the late effort to make the public appreciate this indubitable fact would have had a greater success had it not been managed so maladroitly as to involve the progressive superintendents in a common struggle of defence with those older gentlemen, whose years, or interests, or education, made them blind to the most glaring evils. We know perfectly well of our own knowledge that there are hundreds of physicians in American asylums who, if their own welfare and the welfare of those dependent upon them would not be jeopardized, would eagerly welcome measures of reform that would leave the asylum physician secure in his place, free to attend to purely medical duties, and that would elevate the standard among them. These are the men that would eagerly drink in the knowledge of the anatomy, physiology, and pathology of the brain and cord; that would welcome the use of instruments of precision; that would be glad of therapeutic data, if only they could get all these readily or without grave risking of their material prospects in life. We, therefore, hail with pleasure any institution that does good, honest, scientific work; and this is evidently what the Buffalo State Asylum is doing, if we may judge from the intrinsic evidence of its report. They have 165 male patients. Of these, 123 are employed in these various ways:

On farm	7	In dining-room	21
At the barns	4	In kitchen	5
On lawn	0	In laundry	1
With engineer	3	With laundry cart	5
With fireman	2	With supervisor	1
With carpenter	2	With office boy	2
Painting	1	Unclassified out-of-door work	38
In tailor shop	2		
In shoe shop	1	Total	123
On ward	28		

Of the 167 females, 138 are employed thus:

On ward	27	Knitting	20
In dining-room	23	In centre	2
In laundry	23	Embroidery	8
Sewing	14	School	7
Mending	20	In bed	7
Number restrained	0	Remaining in-doors	37
In covered bed, day	0	On parole	5
In covered bed, night	1	At entertainment	0
Unable to work	20	At chapel	0
Refusing to work	0		
Weather, pleasant	0		

This is a description of a day upon the wards:

Upon the ringing of the bell, the attendants arise and enter upon the labors of the day. The doors of the rooms are unlocked, and such of the patients as are able dress themselves, and prepare for the morning meal. For others, this work must be done; they are the sick, the feeble, and helpless—those whose mental condition has made them indifferent to the ordinary demands of nature. This class of patients must be taken up and bathed, and the simplest offices performed for them. These duties require the exercise of a high degree of patience and self-control.

The steward makes an early visit on the men's wards, notes the time of rising of the household, and the manner in which the various duties are performed, and sees that the food is punctually and properly served. The supervisor also makes a visit before breakfast to the wards under his charge. He ascertains the condition of the sick, enforces kind and considerate care and watchfulness, and receives from the head attendant a report of the occupation of patients during the preceding day. Breakfast is then served, and the quiet and order which prevail during meal-time in the presence of so many insane is a good illustration of what system and supervision can effect, even among the most disturbed classes. After this, the ward is put in order for the day.

The supervisor makes his consolidated report of occupation

and parole of patients to the medical office, and receives from the apothecary shop the medicines prescribed. These are distributed four times a day—after meals and at bed-time. After the ward work has been completed and the medicines given, the various working parties, as directed by the physician, under the charge of an attendant, report to the heads of the departments in which they are employed. Of the women, a large party accompany the laundress to the ironing-room. The patients who do ward work, or are too disturbed or feeble to engage in any outside occupation, go out to walk. After their return, the women sew, knit, embroider, or engage in some recreation, as playing on the piano, reading, talking, or writing. Of the men patients, a larger number seek diversion in games, as dominoes, checkers, chess, or in reading. The more disturbed class, after the acute period of the disease has passed, especially among the men, are the most efficient workers at ordinary unskilled labor, both in and out of doors. The natural restlessness of the disease is thus utilized as far as possible, instead of being expended in destructiveness and violence. In the most acute conditions, the incoherence of action is too great to enable the patient to apply himself to any labor or to occupy his time usefully. Such patients, when not physically too feeble, are taken out of doors for the benefit of air and exercise.

We present a copy of the supervisor's morning report for November 23d, 1883, which is a fair exhibit of the occupation of a day.

The medical management and supervision are thus described:

Soon after nine o'clock in the morning, the physician having noted the report of the night-watchers and supervisors, and received any additional reports regarding subsequent conditions of patients, makes his visit upon the wards. His first duty is to the sick and and the most recently admitted cases. These he examines as to mental and physical state, prescribes both medicine and diet, and gives directions for their care to the supervisor or head attendant of the ward. In case of persistent refusal of food, if unsuccessful in persuasion, he administers it with the stomach-tube. Under the influence of controlling delusions, all nourishment may be refused for weeks or months together, and must be given at least twice daily by the physician. He carefully observes the maniacal and helpless, directing all the details of their care and the use of seclusion or restraint, if either are deemed necessary.

He watches the effect of the association of patients upon each other, and makes such changes in the classification, by removal

from ward to ward, as the varying mental states and the ability to self-control require. He directs the occupation and exercise of patients, encourages the melancholic and depressed, endeavors to interest and amuse the listless and indifferent, and to calm the noisy and disturbed. He converses freely with patients to ascertain their mental condition, and correct, so far as possible, any false impressions, and direct their minds into healthy and normal channels. He listens to all their complaints, investigates the same, and if real, removes the cause. He also gives permission to write to friends when this is not likely to prove injurious to the patient. He endeavors to correct any bad habits on the part of the patients, directs attention to any lack of personal cleanliness or neglect in the matter of dress, or insufficiency of clothing. He inspects the rooms, the beds and bedding, the dining and service room to see that neatness and order prevail. He directs the temperature of the wards, and, on bathing days, the warmth of the bath and mode of its administration. He observes the conduct of attendants, instructs them in their various duties, and calls attention to the rules made for their guidance. In every way he cares for the comfort and health of the patients. In the performance of these duties he spends the forenoon upon the wards. After the completion of his visit he confers with the superintendent regarding the medical care and treatment of patients and the general conduct of the wards, and writes the prescriptions for medicines or changes of the same in the apothecary record. These are subsequently placed upon a blank prepared for the purpose, and constitute one of the permanent records of the asylum.

After dinner the working and walking parties are again formed. The latter sometimes visit the park adjoining the asylum, which is a resort for driving or picnic parties, and at times others walk upon the street or grounds.

Every morning a careful report is handed in from each ward, giving a detailed account of every event that has taken place during the night. "A full report is made of any incidents worthy of note, as finding doors unlocked, lights burning, or any infringement of rules, the condition of the sick, the administration of medicines ordered, the occurrence of a fit, attempts to break out, violent conduct, or disturbance of any character. These are written on separate sheets of paper and accompany the regular report."

This annual report is certainly a model one. If Dr. Andrews and his assistants conduct their asylum as this report would indicate that they do, and as we firmly believe that they do, the Buf-

falo Asylum is a credit to the State. We commend the document to our readers for other merits than those upon which we have had time to touch. * *

Word deafness.—Since the distinction was drawn between sensory and motor aphasia by Wernicke and Kussmaul, numerous cases of pure sensory aphasia or word deafness have been reported. But a limited number of these cases, however, have been followed by an autopsy, and hence each new case reported which is accompanied by a careful record of a post-mortem examination is of interest both to advocates and to opponents of the theory of localization. Dr. Albert Rosenthal, of Warsaw, publishes the following cases in the January number of the *Centralblatt für Nervenheilkunde*.

An apothecary, thirty-seven years of age, had an attack of apoplexy in December, 1878, producing a right hemiplegia, which gradually passed off so that in three months no evidence of paralysis remained. In August, 1879, the man had a second attack beginning with general convulsions, and leaving him paralyzed on the left side and aphasic. The convulsions recurred every third or fourth day, lasting a few minutes, and being attended with loss of consciousness. After a few weeks they became less frequent and he finally recovered so that in three months the aphasia had disappeared and the left hemiplegia was scarcely noticeable. His third attack occurred in April, 1880, leaving him completely paralyzed on the left side, aphasic, and deaf. These, except the deafness, remained, and in September, 1882, he was admitted to Dr. Rosenthal's Asylum in Warsaw, as he was said to be subject to fits of maniacal excitement. On examination it was found that the entire left side, including the facial and hypoglossal nerves, was paralyzed, and the extremities were in a state of contracture. The deep reflexes in the left leg were markedly exaggerated and were radiated to the opposite limb. Sensations of pain were perceived equally on both sides, but other sensations could not be tested on account of the aphasia. The aphasia was a sensory aphasia. The patient was not deaf, he heard the slightest sounds, but he was entirely unable to understand what was said to him. When asked his name he neither attempted to answer, nor did he offer to write a reply, although when the question was shown him in writing, he wrote his name at once. When asked to put out his tongue, or if his head ached, he made no answer. He understood gestures and motions, however, perfectly, and when his head was pointed to be indicated by shaking it that he had no headache,

and by appropriate signs he was made to put out the tongue. He indicated that he could not understand by putting his fingers to his ears when any one spoke to him. He understood writing to some extent, but was often inaccurate in his written replies, showing that the power of reading was impaired. He could speak only five words. He was perfectly conscious of his condition and frequently cried at his inability to speak. He knew his surroundings and recognized friends. He remained under observation a year, showing no signs of insanity, and no evidence of a change in any way. He died of pneumonia in October, 1883.

The autopsy showed two lesions in the brain. The first was a defect of substance on the surface of the right hemisphere involving the paracentral lobule in its external part, the posterior four-fifths of the posterior central convolution in its entire extent, and the adjacent portion of the convolutions of both parietal lobules as far down as to the margin of the Sylvian fissure. It was three and a half by four cm. in extent and eight mm. deep. The defect involved the cortex and the white substance just beneath it, and a tract of descending degeneration was traced through the internal capsule and pons into the left pyramidal column of the cord.

The second lesion involved the first temporal convolution of the left hemisphere in its posterior and upper third, together with the adjacent part of the second temporal convolution. It was one and one-half by two cm. in extent. The cerebral tissue was changed into a hard red substance. Microscopic examination showed distended blood-vessels, fatty corpuscles, pigment cells, and fatty degeneration of the ganglion cells in the parts around both lesions. The diseased tissue had not been examined when the case was published.

After alluding to a similar case of lesion in the post. central convolution reported by Charcot, and attended by a similar paralysis with contracture, Dr. Rosenthal discusses the subject of word deafness, stating that this is the eighth case in which the lesion has been found limited to the left first and second temporal convolutions. The stationary character of the lesion and its long duration (two and a half years), taken with the absolute lack of any signs of recovery, proves that one hemisphere cannot do the work of the other, and establishes the localization of the power of understanding spoken words. M. A. S.

A Theory of Allochiria.—In endeavoring to explain this symptom, first-named by Obersteiner, but noted previously by

Leyden and others, one fact must be taken into account which has been overlooked by theorizers on the subject.

As is well known, the delicacy of cutaneous space perception can be considerably increased by practice, particularly by frequent testing with the æsthesiometer. It is also generally admitted that the increase is not due to any anatomical or physiological changes in the cutaneous end-organs, but to such in the perceptive centres themselves. The remarkable fact is established, in the course of such experiment, that the cutaneous space perception is equally increased on the corresponding part of the body, on the side opposite to that which is trained. This proves that a commissural mechanism exists by which the physiological refinement is transferred to the side *which has no peripheral stimulus applied to it.*

If we assume that the only gray matter connected with the tactile tracts is that constituting the organ of perception, as ordinarily considered, namely, the cortex, we are compelled to suppose that the corpus callosum is the mechanism through which this transfer takes place. But it is entirely arbitrary to assume that all *receiving depots* for tactile impressions are covered by the designation of "perceptive centres." There are numerous unconscious processes of an elaborate kind occurring in the spinal gray, of which several imply a faculty on the part of the spinal cord to appreciate *locality*, even when entirely separated from the brain. It is in accordance with this fact, combined with the symmetrical training of unexercised sensorial fields, that a theory of allochiria can be framed which harmonizes with all known facts.

Let us assume that the tactile nerves for the leg A abut in the gray matter of the spinal half a, and the tactile nerves B in the spinal[1] half b; further that the centripetal continuation of the impressions received at a from A runs in the tract α, that of the impressions received at b from B in the tract β, and that there is a commissural connection ab uniting the gray spinal receptive halves. Physiologically, let us assume that the least resistance to conduction is in the channels $Aa\alpha$, or $Bb\beta$, but that there is also a slight deviation across the median line $Aab\beta$ and $\beta ba\alpha$. This latter deflection is insufficient to awaken conscious perception, but it is the channel through which the unconscious refinement of sensation alluded to at the outset takes place. It is a general law of spinal physiology that the impediment of sensory conduction in a given

[1] It is not intended, by using letters of the same sound, to imply that the nerves terminate ultimately on the same side as that of the limb they come from.

channel increases the intensity of the perceptional explosion, conveyed by other channels from the same source. This is instanced in the intensification of pain conception when conduction is limited to the gray substance, in Schiff's well-known experiment. If we suppose that the tract α is destroyed or interfered with, the impression may flow off from a into the commissural tract ab to the spinal half b, and thence brainwards through the tract β. The tract β being connected with conscious perceptive centres which are normally accustomed to respond to tactile signals from the leg B, it therefore happens that allochiria, *viz.*, confusion of sides, occurs, the impression at A being referred subjectively to the symmetrical part of B.

One reason why allochiria is a rare symptom in locomotor ataxia is that the distribution of the lesions is usually symmetrical. The tracts α and β are, as a rule, evenly involved, and it is only when the altitude of the lesion is higher up along the tract α than along the tract β that an impression, starting on the leg A, blocked above a, is yet able to escape through the channel $ab\beta$.

Hammond's explanation, as given at a meeting of the New York Neurological Society, about a year ago, is not in harmony with any known fact in neuro-anatomy or physiology. His hypothetical tracts are the creatures of arbitrary assumption and without an iota of even collateral evidence in their favor. It is sufficient to characterize this theory that he assumes *two* lesions at *different* altitudes on *opposite* sides of the spinal cord, while the sensory tract dodges out and in to avoid them, crossing the median line *repeatedly*, after the manner of a fox's track doubling on the hounds. E. C. S.

The So-called Neurokeratine.—A very thorough and careful examination of the structure of the medullated nerves, undertaken at the laboratory of Ranvier[1] by WALDSTEIN and WEBER, yielded the following results: The pancreatic ferments which have been employed by Ewald, Kühne, and others in similar studies have very different digestive powers, varying with the animal species from which they are obtained, the state of its digestion at the time of slaughter, and the method followed in extracting it. There is also considerable difference in the action of the same pancreatine on the nervous tubes of different animals; thus, the membrane of Schwann and the axis cylinder of the frog

[1] Etudes histochemiques sur les tubes nerveux à myéline. Par le Dr. L. Waldstein, de New York, and Ed. Weber, préparateur du cours d'anatomie générale au College de France. Arch. de Physiologie, 1882.

are digested by pancreatine, after treatment with alcohol, while the same tissues in the rabbit are not digested. All these and other facts show that one and the same tissue may have fundamentally different chemical characters in various animals.

As is well known, Ewald and Kühne[1] observing that, after subjecting nerves to the action of boiling alcohol and ether, the dissolving myeline left behind it a gnarled trellis work (*knorriges Gerüst*) consisting of two reticulated sheaths, one immediately surrounding the axis cylinder, the other duplicating the membrane of Schwann, which two were mutually united by radiating spokes, and, finding that they resisted the digestive action of pancreatic ferment (trypsin), concluded that they had demonstrated the existence of a special substance, which they denominated neurokeratine. They further identified this substance—with some reservation as to its exact identity—in the neuroglia. Confirmatory observations followed: Tizzoni,[2] for example, found the gnarled trellis work in the normal nerves, discovered that it disappeared in the degenerating ends of divided nerves, and that it reappeared in regenerating ones. But a more critical analysis induced other observers to question that this structure was preformed, or existed in the shape described by Ewald and Kühne. Thus Hesse, from a careful observation of the bizarre forms assumed by myeline when submitted to the action of water, that the corneous substance could not possibly be a distinct morphological element of myeline, but, rather, must be diffusely mingled with it, and Pertik[3] gave the death-blow to the alleged discovery, by showing that the architecture of the gnarled trellis-work differs according to the degree of concentration of the alcohol employed in bringing it out. Notwithstanding these contradictions, many high authorities, such as Schwalbe among anatomists, and Hoppe-Seyler among chemists, have accepted the existence of the neurokeratine, the latter with some reservation. The authors of the paper from whom these historical facts are gleaned submitted the entire question to the test of an elaborate series of experiments, employing the pancreatine of Defresne, which has a high digestive power, so that in twenty minutes it digested a floccule of boiled fibrin completely at a temperature of 40° C., as well as

[1] Ueber einen neuen Bestandtheil des Nervensystems. Verh. d. naturhistor. medicinischen Vereines zu Heidelberg, 1877, p. 451.

[2] Sulla patologia della tessuto nervoso. Archivio per le scienze mediche, 1881, p. 221.

[3] Pertik: Untersuchungen ueber Nervenfasern. Arch. f. mikr. Anat., xix. (1881), p. 183.

several kinds prepared by themselves. They found that the trellis-work obtained by the procedure of Ewald and Kühne did not take carmine or osmic acid staining, but stained very well in anilin red, hæmatoxylin, and gold chloride. A number of plates accompany the paper under consideration, showing the different appearance of the trellis-work in the frog and rabbit, it being more like a true net-work in the former than in the latter. The authors repeatedly make use of the expression fat as an element of the myeline, though evidently aware that there is no true fat in the nervous structure; there is certainly no good reason for retaining the term.

In order to test the statements of Ewald and Kühne as to the substance in the so-called neuroglia which resisted the action of the pancreatic ferments, Waldstein and Weber subjected cords of oxen to the freezing process, made sections therefrom which could be submitted to a magnifying power of four hundred diameters. They then submitted the section to the action of pancreatine at a temperature of 40° C., and found that the "doubtful" fibres of the neuroglia[1] became thinner, and showed, at certain intervals, refractive nodules, to disappear altogether in about twenty minutes, leaving nothing behind to mark their former site than the refractive nodules in question. An interesting observation was made on the cord of an ataxic patient; here the fibrillæ were well-developed in the sclerosed portion, and they disappeared entirely in from fifteen to twenty minutes when subjected to the above procedure, while the septa coming from the pia mater showed no change whatever. This certainly shows that the fibrillæ of the neuroglia are an entirely distinct substance from the connective tissue derived from the pia.

It is well known that if absolute alcohol be injected into the fresh spinal tissues of a rabbit, there may be dissociated nerve tubes which exhibit the irregular arborization around the axis cylinder described by Henle and Merkel.[2] These present a striking resemblance to the trellis-work found in the peripheral nerves by Ewald and Kühne. This leads one to believe that the neurokeratine of the nerve-centres is, like that of the peripheral nerves, the result of a myeline disintegration. The reason cer-

[1] The fibrillæ which are narrower than the naked axis cylinders, not as thick and straight as those radiating inwards from the pia mater, are of the same diameter throughout, neither divide nor anastomose, and whose ends cannot be traced.

[2] Ueber die sogenannte Bindesubstanz der Centralorgane des Nervensystems. Zeitschr. f. rat. Med., 3te Serie, 1, 34, p. 49.

tain observers found the so-called neurokeratine in the ganglionic masses of the brain can be readily accounted for by the fact that, contrary to the belief and knowledge of many, there are medullated tubes in the gray substance itself. Nor does it require the action of osmic acid, recommended by Exner, to prove this, in part at least. All the facts observed show that "neurokeratine" is only found where myeline occurs, and must therefore depend on it for its formation—in other words, must be a phenomenon of the dissociation af the myeline itself. E. C. S.

Physiology of the Vaso-Dilator Nerves.—While the physiology of the vaso-constrictor nerves is becoming satisfactorily known, and is extensively studied; that of the vaso-dilators, whose very existence has been disputed, has only recently received a share of the attention so profusely given to the angio-motor apparatus as a whole. DASTRE and MORAT, after some introductory statements of well-known facts—facts of a kind that may be found laid down in primitive text-books, and without which it seems French writers find it impossible to introduce a subject, but with all which they seem to be unable to escape such gross and palpable errors as the assertion that the vaso-motor nerves are only excited by irritations which are "automotrices ou réflexes," that is, automatic or reflex—devoted a long series of experiments to the physiology of the bucco-facial vaso-dilators. Beginning with the old observation of Schiff that the vessels of the rabbit's ear undergo a rhythmical contraction, the authors observed attentively the condition of the median auricular artery which undergoes, as Schiff observed, apparently spontaneous dilatation to the treble of its normal calibre, or as extreme a contraction, without any relation to the cardiac or the respiratory movements. These extreme excursions can be stopped by the division of either of the antagonistic nerves, that is, of the vaso-dilators and vaso-constrictors of the ear-vessels. After a series of operative experiments on various sympathetic and cervical nerves, the authors conclude that the vaso-dilators of the ear, as well as of the bucco-facial region, *may have* two origins—one in the spinal cord, the other in the oblongata. The chief ground for this belief, as expressed in the monograph[1] under discussion, is, that, even after dividing the cervical or thoracic sympathetic, the reflex or asphyxial irritation of the nerve-centres still suffices to provoke a certain degree of vascular dilatation. Inasmuch as the influence of the cord on the vessels is

[1] Les nerfs vaso-dilateurs de l'oreille externe, *Arch. de Physiologie*, 1882, p. 326.

eliminated by the section of the sympathetic, it must be the oblongata which exerts the influence in question. It is remarkable that the writers cited should lay any stress on the influence of asphyxia. There are other facts than those which seem to have been at their disposal which might justify their final conclusion that the medulla oblongata is the most important and systemic vaso-dilator centre. E. C. S.

The Fibrillary Tremor of the Tongue.—There is an unfortunate tendency in the minds of some writers and teachers to attach undue importance to single symptoms. Perhaps no more erroneous generalization has been made than that which attributes to fibrillary tremor of the tongue an essential relation to paralytic dementia in its early stages. While almost any organic nervous disorder may be a complication of paretic dementia, and thus the symptoms of ordinary nervous diseases be engrafted on those of the typical psychosis, and while degenerative processes in the cranial nerve nuclei are common, and thus determine this symptom of degeneration, the latter may be entirely absent in the earlier periods of the disease. We have recently observed two subjects, one having already developed delusions of aggrandizement, and the other being far advanced in dementia, in neither of whom was there either fibrillary tremor of the tongue, or the vibratile tremor of the hands. It is common to see the tongue manifest a vibratile general tremor; again, it is observed that the neat adjustment of fascicular contraction is destroyed, some fasciculi are more innervated than others, and a sort of struggle ensues, thus producing a spurious resemblance to a fibrillary tremor, though, in reality, it is an ataxic phenomenon. If any kind of motor disturbance is to be considered characteristic of the early period of paralytic dementia, it is the tiring of the co-ordinating apparatus. The consequence is that, the longer the patient continues to hold out the tongue, or to extend his arm with the fingers spread, the more frequent become certain involuntary movements, usually fascicular in the case of the tongue, and limited to individual fingers in the case of the hand. This latter was prettily illustrated in the case of a Mrs. M———, who had no vibratile tremor, but whose fingers closed up, one by one by jerks, until all the fingers were together, she having been ordered to spread them and keep them so. In some patients, individual fasciculi seem to be continuously in a state of tonic contraction, producing an actual pitting of the tongue surface from the traction on the mucosa. E C. S.

Analgesia of one Limb.—Prof. M. BERNHARDT, of Berlin, reported the following unique case, at the December meeting of the Gesellschaft für Psychiatrie and Nervenkrankheiten. (*Berliner Klinische Wochenschrift*, Jan. 28th, 1884.)

The patient, a boy, fifteen years old, while lifting a heavy weight, felt suddenly a sensation of formication in his right arm and shoulder. The sensation was not painful, and the arm did not lose strength. Three years after, he applied at one of the Berlin hospitals, and examination then showed a total loss of the perception of painful sensations in the right arm and shoulder, the area of analgesia extending up upon the neck to the line of the lower jaw and involving the ear; and on the thorax down to the level of the fourth rib and around to the middle of the shoulder blade. Pricks with the point of a needle, cuts with a knife, and the electric brush at full strength were not perceived in these parts at all. Differences of temperature were also not perceived. The perception of tactile sensations, tested by the æsthesiometer and by other tests, was normal. Sensations of pressure were accurately perceived, small differences of weight being at once detected. The muscular sense and the motor power were not impaired in any way nor were any contractures present. He perceived changes of position in the fingers at once, and there was no ataxia. This condition remained for over a year, while the boy was in the hospital, and, according to his statement, had been present constantly since the sudden attack while lifting the weight, four years previously. He claimed that the right hand was not as strong as prior to the attack, but its strength was found to be about normal, and was greater than that of the left hand. There were no evidences of vaso-motor disturbance.

In presenting the case to the Society, Prof. Bernhardt discussed at some length the diagnosis of the nature and position of the lesion. He considered that the absence of paralysis, of loss of muscular sense and of sensations of touch and position made the diagnosis of a lesion in the cortex of the brain impossible. The case was not one of monoplegia. A cerebral hemianæsthesia was also improbable, as lesions in the internal capsule producing this symptom never select the fibres from one limb only, and are not known to produce a loss of one kind of sensation. The absence of disturbances of the sensory organs, of hearing and of taste, and the absence of hemianopsia, which are produced by lesions in this region of the internal capsule, also showed that the disease was not located in this part of the brain. The case was evidently not one of hysteria. The boy had none of the characteristic signs

or appearances of this affection, and the history failed to show any previous hysterical attacks. He had been under observation over a year, and the symptoms had not changed in any particular. Hysterical anasthæsiæ involve, as a rule, the entire side, not one limb. Hemianæsthesia occurs with lesions in the spinal cord in the form of Brown-Séquard paralysis. But in that disease, there is also paralysis on the side opposite to the anæsthesia—a symptom which is wanting in this case. The lesion could not, therefore, involve the *entire* half of the cord. But it must be in the cord, as a lesion of a sensory nerve interfering with but one kind of sensation was out of the question. The absence of motor symptoms, the absence of trophic disturbances, the normal reaction of the muscles to the electric current, with the peculiar limited distribution of the analgesia led Bernhardt to make a diagnosis of a lesion in the gray matter of the cervical portion of the spinal cord in the region in which the right posterior nerve roots terminate. This diagnosis was based upon the physiological fact discovered by Schiff that sensations of pain and temperature are transmitted by the gray matter of the cord, while sensations of touch pass along the white fibres in the posterior columns. The posterior part of the gray substance only was involved, as the anterior motor cells were not affected.

Having localized the lesion, its nature was then discussed and a syringo-myelitis diagnosticated. This was based upon the occurrence of similar symstoms in five cases already reported of a partial loss of sensation in which a destruction of a portion of the central gray, with the formation of a cavity, had been found. In none of these cases, however, was the distribution of the analgesia limited to the arm, and in several of them vaso-motor disturbances were prominent. The diagnosis was, therefore, a provisional one, and the case was presented rather because it was a unique one than because Prof. Bernhardt was certain as to its nature.

M. A. S.

Neuro-anatomy of the Cestoda.—Some years ago it was shown that the *cestoda* have a differentiated nervous system—a fact which until then had been denied; recently GRIESBACH[1] studied the anatomy of the nervous system of one species of this family, which a short time previously Roboz[2] had elaborately analyzed. The former observer on the whole confirms the latter, deviating

[1] Ueber das Nervensystem von Solenophorus megalocephalus, Arch. f. Mikr. Anat., xxii., 2 (April 4th, 1883.)

[2] Zeitsch. f. Wissensch. Zoologie, xxxvii., 2.

in a few details. Each scolex has four ganglia, which are so arranged that together they constitute a cross pattern, though not in one plane; the two in the median line being much deeper than the lateral ones, which are in the level of and near the suckers; the latter probably correspond to the sucker-ganglia described by Blenchard,[1] and measure about 0.059 mm. in diameter; the former are larger, about 0.075 mm. The ganglionic elements are described as "unipolar," "bipolar," and apparently even "apolar," are without a membrane. The ganglia are separated from the surrounding connecting substance by a strongly refractive substance which does take staining well. Griesbach was unable to identify the striped appearance of this substance noted by Blumberg in several species of *Tænia*.[2] All the ganglia are united by commissures, the deeper pair by one which envelops the ganglia in a sort of eight-shaped loop, the more superficial pair by a broad transverse one, crossing the other at right angles; in addition, the two pairs are connected by slender commissures. The deeper pair, that is the one in the median line, sends a large nerve to the suckers, which are surrounded by it as by a ring apparently; numerous fine ramifications of the nerve fibrils are seen throughout the animal, but none go to the cuticula, as Blumberg found in other species, the majority supplying the suckers. The nervous system of the strobila of Solenophorus is composed of two longitudinal trunks which originate from the deeper median ganglia of the scolex, and running just external to the water-tubes near the proglottidean margin, extend for the whole length of the strobila. Their course is not direct but a little wavy; they are composed of delicate fibres and scattered ganglionic elements. Griesbach was unable to identify the peripheral nervous system corresponding to these ganglionated cords which Schiefferdecker describes. With Kahane,[3] Griesbach believes that these cords represent an undifferentiated ventral medulla. E. C. S.

Hyaline Substance in the Perivascular Spaces.—We have found in three cases a peculiar material in those true perivascular spaces which result under pathological circumstances. To this material the name hyaline substance has been given. In the first case, one of typhomania (acute or grave delirium), we are not certain to what extent the employment of alcohol may have

[1] Ann. d. sc. nat., iii., S. T. X., 1848.

[2] Archiv f. wissenschaftl. u. practische Thierheilkunde, Bd. iii., 1877.

[3] Jenaische Zeitschrift f. Naturw., Bd. viii.

added an artificial element. In the other two, alcohol was not permitted to touch the specimen, and it was evident that the material had been deposited during life. In both these instances the subjects had in a marked degree suffered from syphilitic cerebral symptoms. In one, there were numerous subdural syphilomata; in the other, advanced ventricular and vascular lesions. The material was more consistent in the latter case, took carmine staining well, in the former it crumbled more and stained more deeply, probably owing to longer submersion in a strong bichromate of potash solution. The exact significance of this lesion is not known. Advanced disintegration of the ganglionic cells of the nuclei of the medulla accompanied it in the case where there were advanced ventricular and vascular lesions. Aside from mechanical dehiscence of pigmented cells, one specimen was found in which a (rapidly) swollen mass of hyaline material had blasted the protoplasm so to speak into numerous fragments, one of which still adhered to this mass. E. C. S.

The Cartwright Lectures.—These lectures were delivered by Professor Burt G. Wilder in the Hall of the Young Men's Christian Association, on the general subject of "Methods of Studying the Brain." When it is borne in mind how much the dissection of this important organ is neglected, the selection of the subject, and of the lecturer, than whom none have done more to call due attention to an important subject, will appear an admirable one. Three lectures were delivered, respectively on the 2d, 4th, and 6th of February, the following being the special subjects considered: February 2d—Limitation of the Subject to Macroscopic Encephalic Morphology. Methods of Regarding the Brain Based upon its Condition in Embryos and Amphibia. February 4th—Methods of Preserving and Examining the Brain. February 6th—Methods of Figuring and Describing the Brain.

These lectures were attended by a large body of students and physicians, and are being published in full in the *New York Medical Journal*. * * *

Correction.—In the number of this JOURNAL for August, 1883, on page 7 of Prof. Wilder's paper "On the Brain of a Cat Lacking the Callosum," the right hand figure represents the normal brain and should be numbered three, and the other four. W.

Checks on Attendants at Asylums.—Our esteemed contemporary, *The Alienist and Neurologist*, has proposed to check

cruelty by attendants of hospitals for the insane, by having the state enact special penal laws for cruelty to the insane. To this no one who has the welfare of the insane at heart would object. It also proposed that such laws should be conspicuously posted up in suitable places in the hospitals. From a psychiatrical standpoint, there are many objections to such a method of notification. The insane should have confidence in those living in close contact with them. To post such notices where the insane could see them, would be to lead them to suspect their attendants, and the existence of such suspicions would have a decidedly bad influence on the morale of an hospital for the insane. The constant and unexpected supervision by the superintendent over attendants is a much better means of protecting the insane. To know that his work is supervised lowers no one's self respect, but to be told in the most public manner that one is suspected of being a brute is very humiliating. If such laws were on the statute book, the attendant could be, with less humiliation to himself and without bad effects on the patients, informed of them privately or in lectures, such as are given in training schools and in many well-regulated asylums. *

The Gustatory End-organs.—To an interesting description of the tongue of one of the rarer marsupials POULTON adds the following lines, opening a commentary on the origin and nature of taste-bulbs. "This low form of bulb found upon the fungiform papillæ suggested to me a possible explanation of the manner in which taste bulbs have originated in the mammalia. At the outset it seems probable that in Marsupials or Monotremes we have the best chance of finding the course followed in the development of these and other structures, as we know them in the higher mammals. For in these extremely ancient types, owing their existence to isolation, with little rivalry to render structural advance and complexity necessary in such forms, it is certain that long halts will be made at stages left behind in the development of other animals, living on more warmly contested areas. There is little doubt that the gustatory terminal organs have more in common with those of the general surface of the body than any other special sense. There is great structural resemblance, actual structural continuity, between skin and the oral mucous membrane with the epithelium. Certain sensory terminal organs are found in both, although it is probable that they subserve the tactile rather than the gustatory sense in the mouth." The author then goes on

to show how,[1] before the specialization of the gustatory function, the terminal organs of taste would be placed as in the skin namely, in the papillary outgrowths, for in this situation they would be nearest to the gustatory stimuli, without actual perforation of the epithelium. The chief taste areas would then become sheltered by the development of folds, either of the circumvallate or foliated type. The substitution of a higher form of terminal organ takes place by the growth of the columnar cells forming the lowest layer of the interpapillary process; they would, in approaching the surface, elongate and converge, while the nervous structures would concentrate about these new end-organs; this is the stage of the fungiform papillæ. One great difference between the gustatory and such end organs as the auditory and olfactory is here made manifest. In the latter the auditory and olfactory cells are isolated, each being *separately* protected by columnar cells; in the former, however, the gustatory cells are massed together, and are surrounded *as groups* by protective cells. This difference is simply due to the fact that the development of the olfactory and auditory cells takes place from a tolerably plane surface, whereas the gustatory cells have elongated "from the curved surface of an interpapillary process—approximately the segment of a sphere, and therefore have met and penetrated the surface in a group." Only the axial cells of this group become end-organs, the external becoming protective; finally the papillary elevations disappear between the bulbs, and the latter rest in the cavities of the epithelium with a nearly plane surface below. This degree of development is never reached in the marsupial Perameles nasuta. "The papillary upgrowths separating the bulbs give to them the appearance of interpapillary processes to a marked degree." In fact, there is the greatest resemblance between the bulbs, and the interpapillary processes of the epithelium on the outer wall of the trench, a resemblance so great as to suggest this explanation of the origin of the bulbs." The author cited proceeds to prove by an ingenious reasoning that the filiform papillæ are rather tactile than mechanical, that is, prehensile in function. His chief reason for this conclusion is, that in Parameles and other species, who utilize the tongue as an organ for the capture of insects and other mechanical purposes, certain peculiar papillæ are developed not found in other forms, while the distribution of the former is not in consonance with mechanical purposes. E. C. S.

[1] The tongue of Perameles nasuta, with some suggestions as to the origin of taste bulbs. By Edward B. Poulton, M.A. (with one plate). Quarterly Journal of Microscopical Science, January, 1883.

The Abuse of Expert Testimony.—The vagaries of expert testimony developed in the course of certain recent murder trials are worthy of record. In the Nutt case, additional discredit was thrown upon the much-abused term "emotional insanity." It will be remembered that Nutt, a young man, deliberately shot one Dukes, who had brutally assassinated Nutt's father, and been found "not guilty" by a notoriously corrupt jury. No juror could be blamed for finding that a homicide committed under such circumstances was justifiable on the mere grounds of equity and common sense; and there is no doubt whatever that no jury could have convicted the avenger of a father slain under such provoking circumstances as those under which the elder Nutt met his death. But with this Nutt's counsel were not satisfied; they determined to utilize the insanity plea, and they found half a dozen "experts" to sustain the claim of "emotional insanity." The jury found Nutt "not guilty, on the ground of insanity," and, as under the practice of the Pennsylvania courts, Nutt would have to have been otherwise committed to an asylum, he was straightway examined by a number of experts, (whether the same or a new set the papers do not inform us, and pronounced perfectly sane).

In the Rowell case, the claim of epileptic insanity was made, and strengthened by the opportune illness of the prisoner's sister, who was pronounced suffering from "vertigo, a concealed form of epilepsy," by her physician, who was straightway employed as and transformed into an expert for the occasion. In addition, Dr. E. C. Mann testified for the defence and Dr. Andrews, superintendent of the Buffalo Asylum, testified for the prosecution. The latter physician was placed in a very uncomfortable position, illustrative of the absurdity of a hypothetical examination. According to the reports, he was compelled to answer hypothetical questions from both sides in the affirmative. He said further to the defendant's counsel that the man described by the prosecution might be insane. He would determine the question by the man's conduct and by details in reference to his conduct in other matters prior to and after the shooting. There might be other facts which, added to those in question, would satisfy the mind of a medical expert that the man was insane. When an affirmative answer was given to a hypothetical question of the defence, the audience applauded. This was severely rebuked by the court as out of place, and as having but one object, to influence the court and jury in disposing of the questions to be determined. Curiously enough, the jury acquitted Rowell, not on the ground of insanity, but on that of alleged self-defence.

It seems to us that the only proper solution of this question of insanity in courts, is to take it out of the hands of juries altogether. That juries are swayed by the emotions of the court-room audience, by the rhetorical skill of lawyers, and by the directions of possibly biassed or narrow-minded judges is notorious. It is not so very long ago that a young woman, suffering from erotic monomania and delusions of persecution, shot and wounded her alleged rival. Much sympathy was shown at first in her case, and had she been brought to trial immediately, there is not the slightest doubt that a soft-hearted jury would have acquitted her altogether, irrespective of her mental state. But the seducer of the girl, as well as the husband of the woman murdered, did all in their power to secure a conviction, and the trial was delayed several months, in order to "get up" new evidence. The official examiner of the insane in the city where this occurred, as well as another physician, testified to the existence of the form of insanity above mentioned. They had both made thorough and repeated examinations of the prisoner, one of them in his capacity as physician to the jail. The prosecutor placed two medical politicians on the stand, *one of whom had examined the prisoner, but declined to give any opinion based upon his personal examination;* instead, he testified that she was sane on a hypothetical question, and involved as many inuendoes against the prisoner—being what is called a dexterous witness—as he safely could without subjecting himself to the risk of a cross-examination. His colleague had not examined her, *but from seeing the prisonor in the court-room and the facts of the case as related in the hypothetical question,* he testified that the prisoner was merely suffering from hysteria. The prosecutor wound up with an eloquent philippic, comparing the prisoner to Phryne, and two of the jurors who had become convinced of the insanity of the girl, yielding gracefully to the other ten, she was convicted. Jurors are also liable to the influence of newspaper and public opinion in a very high degree. An unfortunate illustration of this is furnished by the history of the jury which found Guiteau guilty. It seems that several members of that jury regarded Guiteau as insane, and one juror is now in the Government Asylum at Washington, having become insane through remorse at his action. In the Gosling trial the court-room was filled with a *claque*, who were instructed to applaud or to ridicule the medical witnesses as directed. The jury found Gosling sane; two weeks later he was removed to an asylum, and continued in asylums until the day of his death, which occurred on the 19th of January last. In this case the preponderance of medical testimony was to the

effect that Gosling suffered from general paresis, but the *claque* determined the verdict, and a gross injustice was done to a very worthy family to the benefit of persons who profited financially and otherwise through the undue influence they were able to exercise on the unfortunate lunatic. A scientific witness cannot help entertaining the most profound contempt for the opinions of a jury. When he reflects that, as a rule, a jury is not selected from the more intelligent portion of mankind, and that at the very best those persons sitting in judgment on his opinion may be the very ones to consult him as to their own mental or nervous disorders in his office the next day, the absurdity of his position must almost render him inclined to comment upon it to the disadvantage of the party calling him, or, if he be unscrupulous, to resort to clap-trap and undignified badinage to prove his general cleverness. Even a stupid jury can appreciate a pun or a good piece of repartee, when the most solid scientific evidence would act as a narcotic. This single fact constitutes a fatal objection to the jury system as applied to insanity cases. * * *

Remarkable Geography.—A periodical published by the "Medico-Legal Journal Association," which latter, as we learn from the cover of the former, is located at No. 128 Broadway, contains the following names of neurologists with their residences: Dr. *Frocbelius* (?), of Saargemund; Dr. *Heilicenthal* (Heiligenthal), of Baden-Baden; Dr. Hadler, *Illenan* (Illenau); Dr. *Schicle* (?), Baden-Baden; Dr. Stilling *Privatdocent* (Dr. Stilling, Privat docent), Strassburg; Dr. Wildermuth, Sictlin (?); Dr. Flamm, *Pfullinger* (Pfullingen); Prof. Dr. *Fovel* (Forel), Zurich; Prof. von *Gu'den* (Gudden), Munich; Director von Koch, *Zweifatten* (Zweifalten); Dr. Spamer, *Mainitz* (Mainz); Prof. Dr. *Vierondt* (Vierordt), Tübingen. In half a dozen places Illenau is given as *Illenan*. A few errors of this kind are permissible, but when it is recollected that those above cited are aggregated in two short paragraphs, and are typical of the get-up of the journal throughout, the question arises whether the proof-reading—perhaps the compilation of the journal—is not the work of the same office boy, whose services are recognized in the items of the monthly bills presented to the Medico-Legal Society under various curious heads. * * *

Spina Bifida.—The New York *Medical Journal* of January 26th, 1884, contains a lengthy article from the pen of Milton Jo-

siah Roberts, M.D., under the following caption: "Spina Bifida, Chronic Internal Hydrocephalus, Hydrorhachis, Double Convergent Strabismus, and Double Talipes Varus existing concurrently; an Ocular Demonstration upon the Living Subject of the Communicability of the Fluid in the Sac with that contained in the Ventricles of the Brain by Means of an Instrument of Precision; the Injection of Morton's Fluid followed immediately by Coma, and Four Days subsequently by Death, together with the Post-Mortem Appearances." A fine impressive title is this not? The reader is compelled to pause after its perusal, and gather fresh strength for the mastery of the equally elaborate body of the paper.

The account of the termination of the career of Dr. Roberts' interesting patient is pathetic in its simplicity and, we were about to say, naïveté. It reads as follows: "I had introduced only ten minims (of a fluid containing iodine, ten grains; iodide of potassium, thirty grains, and one ounce of glycerin to be injected into the sac) when, *to my surprise*, my little patient suddenly ceased breathing, and the radial pulse became imperceptible. Efforts at resuscitation were immediately begun, which, after a half-hour's anxious and persistent efforts in the use of stimulants and artificial respiration, resulted in the re-establishment of pretty regular breathing, though the child did not regain consciousness. He remained comatose for four days, at the end of which time he died." Unfortunately we are not informed whether Dr. Roberts continued "introducing" the irritating fluid in a case which had previously been demonstrated by his "instrument of precision" (a sphygmoscope) to present a dilated central canal "communicating through it with the ventricles of the brain."

It is not surprising that the sad result of the treatment adopted in this case reacted on the article in which it is related. This is illustrated by the following authology. "It would be interesting to follow closely the further histological differentiation of the embryonal *units* into their *heterogenous* axial and appendicular *sequalæ*." "The etiology of these disastrous *sequences of the perpetuation* of the human race is another point of interest which has always had charms for speculative, inquiring, and credulous minds."

The most valuable part of Dr. Roberts' paper consists, not so much in what it explains, as in what it suggests. In this field, that writer has shown a broadness and boldness rarely attempted by scientific workers. Thus he concludes his article with these words: "In making a retrospective survey of a case like the foregoing, the query very naturally suggests itself: Could these em-

bryonic defects have been prevented? Or, to make the question more general: Is it possible, under any circumstances, to prevent developmental deficiencies? This opens a very wide and inviting field for speculation and experimental research. The limits of this paper, however, only permit one to express the opinion that already sufficient facts have been carefully observed and recorded to make an affirmative answer to this question highly probable."

No one can ponder over this, Dr. Roberts' peroration, without becoming impressed with the truth of his opening lines, in short, that the case which led to these reflections, "is a very interesting one, not only on account of its rather infrequent occurrence, but because of the etiological, morphological, therapeutical, and prophylactical queries which are inevitably forced upon the mind of the scientific physician, whenever he is consulted in regard to anomalies of this kind."

We have only one fault to find with Dr. Milton Josiah Roberts' paper, and that is that, at the very moment when our interest in his fascinating descriptions of embryonic development, of biological questions, and of preventive possibilities is most actively aroused, he discovers that the "limits of his paper" will not allow him to go further, or that "such a course," however, "does not fall within the intended limits of my present remarks." We regret this very much, for more than one reason. * * *

Sensationalism in Regard to Hospitals for the Insane.—Under this heading, our sprightly cotemporary, the *Alienist and Neurologist*, animadverts on the course of certain "medical journals which ought to know, and are presumed to know, whereof they speak, whenever they discuss asylum methods and management." It denounces their course as reprehensible, as unjustly damaging the "reputation of our hospitals for the insane," as imperilling the "welfare of their inmates," and so on. The journal in question does not indict any particular medical journal, and we are, hence, not in a position to judge of the correctness of its charges. If its statement that the character of the assaults on asylums, in the said medical journals, is kin to that of the attacks made in certain daily journals which depend for their circulation on sensationalism, is true, we shall not hesitate to indorse what it says. That the attack on the asylum policy which was at first opened by competent and disinterested scientists, and directed only against a particular segment of the asylum circle, has recently been seconded by medical advertisers, by sham reformers,

and by unscrupulous or thoughtless persons generally, is not to be denied. And no better evidence of the purity of the motives and the scientific fair-mindedness of those who opened the campaign can be advanced than this, that they ceased to prosecute it when it became evident that it was being made subservient to personal ends.

But the silence of genuine asylum reformers, at the present moment, is neither a token of weakness, nor an admission of a mistaken policy. The steady reform accomplished in the management of many asylums since the agitation, and which is boasted of in several annual asylum reports, is an undeniable evidence that such reform was necessary. We regret to say that there are evidences accumulating, day after day, which indicate the necessity for further reform, and which we feel quite confident the *Alienist and Neurologist* will see no evidence of sensationalism in our reporting. Quite recently, a patient at the Utica Asylum, named Evan D. Hughes, was killed, that is, he died as the result of injuries received at the hands of attendants. The unblushing boldness of the medical management of that institution is amply attested by the fact that the superintendent testified that Hughes' ribs, which were fractured, must have been broken by one of the attendants "falling on him." He testified thus after the nature of the "collision" between the two attendants in charge of Hughes, and their charge was sufficiently proven by their previous admission that one of them had struck the latter on the back of the head, and the other on the abdomen. Three or four of Hughes' ribs and his jaw were broken, all, as claimed by the attendants (seconded by their accomplished and worthy superintendent), being due to the attendants "falling upon the patient." If this is not—like the Odenwald case—an instance of "falling" on a patient tooth and nail, we have yet to hear a correct interpretation of that phrase. The coroner testified that the injuries and marks on the deceased indicated violence.

Now, this is not the single instance where facts have been perverted in the interests of the Utica "hushing-up" policy. Several years ago, a patient was killed, under peculiarly revolting circumstances, at the same institution. The managers attempted to conceal the murder, but it "leaked out." The Senate appointed a committee of inquiry and published a report, all the copies of which were bought up and destroyed—by whom the reader may readily surmise. In the present instance, a hypocritical claim is made of a desire to have the "fullest investigation."

Undoubtedly, an outrage like the abuse or killing of a patient

may happen in any asylum. But the proper course for an honest superintendent to employ is to himself denounce, expose, and punish the perpetrator, or to hand him over to the agents of the law, not, like the heads of fortunately but a few asylums, to become practically accessories and abettors of such acts, by attempting to conceal them when perpetrated, and to make mendacious explanations, shielding the criminal, when they become public. It is by such procedures that public dissatisfaction is being fomented. The people feel that, practically, the asylum walls close out all responsibility on the part of the managers—in some instances judging quite correctly—and it is not they, nor sensational newspapers, that are responsible for general dissatisfaction, but the managers of certain asylums themselves. Who hears today of such public feeling against asylums in England as exists in this country to-day, and as existed in England before the day of Shaftesbury, and which did not quite die out till the earlier period of Charles Reade's misrepresentations ?

Journals devoted to the interests of asylum physicians and inferentially, we hope, to the interests of the insane, can do their cause a greater service by detecting and exposing error, malfeasance, and crime in the management of the insane, than by the mechanical and tiresome repetition of that well-known cry of conservativism, which stigmatizes all censure as sensational. Lasting reforms in asylum management must come from within asylum walls in the main, and the apologists of our asylum system should recollect that progress did not end with Kirkbride, nor is it fostered by such occurrences as those chronicled yearly at Utica. We are not among those who believe that mawkish poetry, addressed to the virtues of the philanthropical Mrs. Dix by the superintendent of the Utica asylum, are a sufficient answer to the growing avalanche of charges, not alone of a "sensational," but also of a scientific and financial character, which is accumulating against what is properly stigmatized as the "New York Asylum Ring."

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A Memorandum for the Medical Prompters of Mr. Corkhill.—The professional experts who recently tried to drag a distinguished neurologist, who had committed the crime of lecturing on comparative anatomy at a veterinary school, to their own level, by inducing an unfortunate lawyer (who became the victim of the operation) to call him a "Horse-Doctor," will doubtless be gratified to learn that the following gentleman, have recently joined the faculty of the Harvard School of Veterinary

Medicine: Robert T. Edes, M.D., Henry P. Bowditch, M.D., J. Collins Waaren, M.D., Reginald H. Fitz, M.D., and Charles S. Minot, S.D. The day may come, at this rate, when it will be much more respectable to be a "Horse-Doctor" than a "Government Expert" conspiring to hang a lunatic. *

Asking Insane Hospital Superintendent to Resign.—The following facts are characteristic of the state of things in Ohio. Certain specific charges were made against Dr. J. J. Lawless, superintendent of the Northwestern Ohio Asylum. A board of commissioners met to ascertain the validity of the charges, and, after investigation, decided by a two to one vote that they were not sustained. But by a similar vote they passed a resolution asking for the resignation of Dr. Lawless as the "easiest way out of the difficulty." This manner of pandering to a popular outcry deserves severe reprobation. If Dr. Lawless was maligned, as the majority of the commissioners believed, then it was the duty of the commissioners to sustain him against his accusers. If, on the other hand, Dr. Lawless was guilty of the acts of cruelty and neglect charged against him, he should not only not have been allowed to resign, but should have been driven from the office with ignominy and criminally prosecuted. These commissioners have been guilty either of persecuting an innocent man in obedience to mob clamor, or of shielding for purely party reasons a criminal deserving punishment. In the first case, the commissioners are weak men, unfit for their office; in the second, they are rascals, deserving punishment. It cannot be said that Dr. Lawless has come off with shining colors; if innocent, he has, by tendering his resignation, given very potent reasons for doubting his innocence. He was a superintendent in Ohio, a State which, like Virginia, West Virginia, and New York City, makes party fealty a test of a knowledge of psychiatry, and which has gone beyond even the places named in turning out good superintendents for purely political party reasons. Removal from office in Ohio would, therefore, be perfectly compatible with an unsullied reputation as an alienist. One of the most deservedly honored members of the superintendents' association suffered in this way. Even in a State where political removals were unknown, Dr. Lawless' course would not be justified. By resigning his position under such circumstances, he has, perhaps unwittingly, cast a stigma on himself, and has certainly not raised the reputation of the class of alienist physicians to which he belongs. *

Causes of "Liberation Epidemics."—The furor which at times seizes the public for the manufacture of sane men out of lunatics has its origin in the love of sensation which characterizes a large portion of the populace; but this furor is fostered and encouraged by men calling themselves experts, who have never studied nor care to study psychiatry, but are at the beck and call of any lawyer who desires to prostitute the writ of *habeas corpus* to the base end of endangering the public by letting wealthy dangerous lunatics loose. It is only a short while ago since a brace of these so-called experts in New York swore that a man who had the delusion that his enemies were persecuting him by means of compressed air, was not insane. And disgraceful to the profession as such testimony is, it is fully equalled in a case now at issue in Chicago. A man who has the delusion (*à la* Lawrence who shot at President Jackson) that he is being defrauded out of an (imaginary) property; who, while in the hospital for the insane at Kankakee, Ill., wrote to Leonard Swett, a leading Chicago lawyer, to take the case against his supposed defrauders, but was advised by Mr. Swett that the Kankakee Hospital was a good place for him to be treated, was tried before Judge Jacob W. Wilken and a jury October, 1882, on a charge of stealing and pawning a revolver. He was found guilty, but adjudged insane. A motion for a new trial was overruled by the court, and he was committed to jail, and sent thence to the Kankakee Hospital for the Insane. He had been shot in the head about five years before that, and the bullet had never been extracted. During that period he had shown various symptoms of insanity, had served a term in the penitentiary, and had frequently been in jail for petty offences. This man called on Dr. J. Adams Allen, and obtained a certificate of sanity from him under the following circumstances, as detailed to a reporter:

"About a month ago, as nearly as I can remember," said Dr. Allen, "a lawyer named Haskell brought this man Faulds into my office, after office hours, and asked me to examine him and make a report on the case. I had a good deal on hand and did not feel very much like being bothered, but I listened to the story told by Haskell, read some affidavits presented, and then proceeded to examine the man, by leading him into the discussion of various topics calculated to draw out evidence of delusion, if any existed. I did not make the examination very thorough, as I desired to make nothing more than a preliminary report, in order to get the matter before the court. The man might have been forty-five or fifty years of age, from what I can now remember, and I was given

to understand from what Haskell told me that he possessed considerable property, if he could only get hold of it; but that his folks were keeping him out of it, and holding him in the insane asylum, while they enjoyed the income derived from it. I didn't take much stock in it, but I thought it well enough to get it investigated by the court."

"Did Faulds tell you how he escaped from the asylum?" the reporter asked.

"Yes; he said they let him go, but that they had told him that he would have to say that he had run away, for the reason that they could not release him without legal process, and that they were satisfied he was sane."

"What was your opinion of the case?"

"I did not look into the matter very closely. I could see no evidence of delusion unless the story of his wealth or the manner of his escape from the asylum should prove to be a delusion. He seemed to me to be cool, collected, and practical, but I must say that my certificate was based partly on what I read in the written statements of other persons which were shown me by Haskell. I did not know what became of the man after he left my office, and have not heard of the matter, and have thought very little about it until now. It seemed to me to be one of those cases fixed up to worry the doctors rather than to accomplish any other purpose."

After this remarkable examination, Dr. J. A. Allen gave the lunatic a certificate of sanity and thus aided him, to the fullest extent, in casting a stigma on two other physicians, officers in an hospitals for the insane, whose reputation and ability are well known to the readers of this JOURNAL, Dr. H. M. Bannister and Dr. R. S. Dewey. In opposition to these two alienists, a physician, known in his own city only as the head of an institution graduating a disproportionately large of its matriculants, expressed his opinion that a lunatic of whom he has made only a very superficial examination, with whom he had no previous acquaintance, and whose circumstances he did not know, was sane, and gave this very suddenly formed opinion for the purpose of bringing the case before the courts, all the while believing the case was got up to "worry the doctors" of the Kankakee hospital. The physician in question is a great stickler for the "National Code of Ethics;" but his conduct in the present case is unethical, in the broadest sense of the term, and should certainly lead to some sort of professional discipline. As he knew so little about the case, he should have left it alone. When some sort of professional punishment is devised for a certain class of experts,

and when lawyers beating up hospitals in search of rich lunatics to release shall be disbarred, fewer murders will be committed by the insane, and the alienist profession will rise a little in public esteem. It will rise still more, as soon as asylums shall cease to furnish experts as dangerous and unscientific as those responsible for "liberation epidemics." *

Psychiatry and Neurology at the Eighth International Medical Congress.—The following subjects will come up for discussion before the psychiatrical and neurological section of the International Medical Congress which is to be held at Copenhagen, on the 10th of August, of this year:

Psychiatry: 1. Statistical view on the Mental Diseases and the Psychiatric Institutions in the Scandinavian countries. 2. Proposal for Uniformity of the Annual Reports of Lunatic Asylums in the various countries. 3. The value of Agricultural Colonies in the treatment of insanity. 4. The value of exercises in the treatment of mental diseases. 5. The significance of the schools for the production of mental diseases. 6. The temperature of the body in the primary stages of mental diseases. 7. Insanity in childhood. 8. Perverse sexual desire. 9. The "Psychic Epileptic Equivalent." 10. The relation of the Progressive General Paralysis to Syphilis. 11. Anatomical characters of the Brains of Idiots. 12. What method for the Weaning from use of Morphia is to be preferred, and where can it be best carried out?

Neurology: 1. The rôle of lesions of the Peripheric Nerves in producing anatomical changes in the Central Nervous Organs. 2. Secondary Degenerations in Brain and Spinal Cord. 3. Disturbances of Speech of Cortical Origin. 4. Disturbances of Vision of Cortical Origin. 5. Cortical Epilepsy. 6. Vaso-motor and Trophic Neuroses. 7. The importance of affections of Peripheric Organs (particularly the sexual organs) for the production of Functional Nervous Disturbances, especially Hysteria. 8. The so-called Amyotrophic Lateral Sclerosis, especially with regard to the constancy of the anatomical changes and its difference from or identity with Aran-Duchenne's progressive Muscular Atrophy. 9. The Curability of Tabes dorsalis. 10. Syphilis as an etiological moment for Tabes dorsalis. 11. Landry's paralysis, especially with regard to the question whether it is a particular disease or a symptom which may be produced by various morbid conditions. 12. The value of Nerve-Stretching in the treatment of various nervous affections.

* * *

Appointments and Changes in Asylum Positions.—Dr. S. Lett has been appointed Medical Superintendent of the Homewood Retreat, Guelph, Ontario, and the Nestor of Canadian alienists, Dr. J. Workman, has been tendered the position of consultant. Dr. R. C. Chenault, at one time superintendent of the Eastern Lunatic Asylum, has again accepted that position. Dr. E. Josselyn, Assistant Physician of the State Lunatic Asylum, Utica, New York, has resigned. Dr. Campbell has been chosen superintendent of the new hospital for the insane at Knoxville, Tennessee. Two New State Hospitals for the Insane are called for in the Iowa Legislature, chiefly to gratify a thirst for the expenditure of money in two incipient towns.

The following notice appeared in the columns of the *New York Times* of June 9th, relative to Dr. Kempster, who, with Drs. Macdonald, Gray, and McLane Hamilton, was prominent in the procedures which led to the conviction and execution of Charles J. Guiteau.

"MILWAUKEE, June 8th.—Dr. Walter E. Kempster, the New York gentleman who was brought West to take charge of the State Insane Asylum at Oshkosh, has been summarily dismissed by the State Board of Control. It will be remembered that Kempster was before the public in an unenviable light a month ago by his wife suing for a divorce on account of her husband's alleged criminal intimacy with certain women. The suit has been temporarily stopped, but it will be resumed this summer." *

A Legal Advance in Forensic Medicine.—In these days when judges are bowing servilely to the mob doctrine of a knowledge of right and wrong as a test of responsibility, it is refreshing to find that at least one judge has the manliness and honesty to deal with the question from the standpoint of abstract justice. In a recent Illinois trial for murder, Judge Upton instructed the jury that if it believes that the evidence established beyond a reasonable doubt that the defendant, at the time of the killing, was not affected with insanity or unsoundness of the mind to such a degree as to create an uncontrollable impulse to do the act charged, by overriding the reason and judgment, thereby obliterating the sense of right and wrong as to such killing, and depriving the defendant of the power of choosing between right and wrong, then such killing shall be murder, and the jury should so find." This instruction is substantially the same as the excellent Austrian code as to responsibility, and rests on the precedent set in the case of Hopps vs. People, in which the Illinois Supreme Court held that the lower court erred in not giving an instruction identical with that given by Judge Upton. *

Drunkenness as an Excuse for Crime.—It would seem that not all the State Courts of the United States agree with the doctrine so ostentatiously enunciated by certain judges who make obeisance to mob jurisprudence. The Texas Court of Appeals (*American Law Magazine*, 1882) sustained a charge of the court below that: "Voluntary drunkenness furnishes no excuse for justification for crime. However, if you find that defendant did make the assault as charged in the indictment, and if you find when he made said assault he was so drunk he did not know what he was doing, and was unable to form the criminal intent necessary to commit the crime charged, then you will acquit him. But any amount of voluntary drunkenness which does not reach the status above indicated one would not furnish any excuse or justification for the commission of it." Whatever may be said against this ruling from a deterrent standpoint, there can be but little doubt that the charge is in full accord with abstract justice. *

Books, Pamphlets, etc., received.—Eighteenth Report of the Board of Trustees of the Connecticut Hospital for the Insane, 1884, from the Superintendent. Annual Announcement of the School of Veterinary Medicine of Harvard University, 1884; from the Secretary. Observations upon the Fœtal Membranes of the Opossum and other Marsupials, by H. F. OSBORNE, SC.D. Reprinted from the *Quarterly Journal of Microscopical Science* for July, 1883. The Visual Area in the Brain, determined by a Study of Hemianopsia, by M. ALLEN STARR, A.M., M.D. So-called "Concussion of the Spine in Railway Injuries," by JOHN G. JOHNSON, M.D., Surgeon to the Union Ferry Company, Brooklyn, Prospect Park and Coney Island Railroad Company, Brooklyn, Flatbush and Coney Island Railroad Company, Brooklyn City Railroad Company, New York and Brooklyn Bridge, etc., etc. Glycosuria, its Complications and Therapeutics, by O. J. DE WOLFE, M.D., read before the Chicago Medical Society, November 19th, 1883. *The Meteor*, Vol. 9, No. 22, published by the inmates of the Alabama Insane Hospital. Disadvantages of the Upright Position, by S. V. CLEVENGER, M.D., from the *American Naturalist* for January, 1884. Preliminary Observations upon the Brain of Amphiuma, by HENRY F. OSBORNE, SC.D; from the Proceedings of the Academy of Natural Sciences of Philadelphia. Spinal Irritation, Probable Cerebral Origin of the Symptoms Sometimes Classed under this Head, by G. L. WALTON, M.D. On Dyspnœa, by BENJ. F. WESTBROOK, M.D. Veins of the Brain, BROWNING, from the author. Neglect of Ear-Symptoms in the

Diagnosis of Diseases of the Nervous System, by G. L. WALTON, M.D. Reports of the Board of Trustees of the Eastern Michigan Asylum at Pontiac, for the biennial periods ending September 30th, 1882, and September 30th, 1880, and the year ending September 30th, 1878, from the Superintendent. The Insanity of Masturbation, by C. B. BURR, M.D., Assistant Physician at the Pontiac Asylum. Cocculus Indicus in Epilepsy, by the same. A Case of Primary Monomania, by the same. Borderland Psychiatric Records—Prodromal Psychical Impairment, by C. H. HUGHES, M.D. The Opium Psycho-Neurosis, by the same. The Stokes Will Case, Argument for the Contestant by THERON G. STRONG. Thirteenth Annual Report of the Managers of the Buffalo State Asylum for the Insane, 1884, by the Superintendent. The Mental Status of Guiteau, a review, by JAMES H. MCBRIDE, M.D. Reciprocal Insanity, by RALPH S. PARSONS, M.D. Ueber die Knochenbrüche bei Geisteskrankheiten. Inaugural Dissertation von DR. MED. HUGO NEUMANN, Berlin, 1883. Our Insane Neighbor, His Rights and Ours, by W. W. GODDING, M.D. Diagnosis of Insanity, by D. A. MOORE, M.D. (Oxford, Ohio). The Spinal Nerves, by A. H. P. LEUF, M.D. The Nervous System of Porpita, by H. W. CONN and H. G. BEYER, M.D., U.S.N. The Prevention of Insanity, by NATHAN ALLEN, M.D., 1883. A System of Human Anatomy, including its Medical and Surgical Relations, Section V.—Nervous System, by HARRISON ALLEN, M.D. Clinical and Pathological Reports on Cases of Insanity, by S. V. CLEVENGER, M.D. Gudden's Atrophy Method and a Summary of its Results, by E. C. SEGUIN, M.D. Our Asylums and our Insane, by SAMUEL AYRES, M.D., Pittsburgh, Pa.

Analysis of a Neurologist's Psychological Construction.—Dr. William J. Morton, in a paper read before the Neurological Society, speaking of the late Dr. George M. Beard, makes the following observations which deserve being cited as models of keen description of character, yea to cite a favorite expression or our distinguished colleague, as the very "warp and woof" of psychological analysis: "Again, Dr. Beard attempted very difficult problems. He often grasped one portion of a circle, *and hauled in upon it only to find the same portion in due time again in his hands.* But far be it from as to criticise. His work is done. And in judging of a man's life-work we must ever keep in mind that we are probably not familiar with an *innermost correlation of factors* peculiar to the man, worked out in his own consciousness, but

concealed from his friends, and born of his attrition against circumstances." E. C. S.

Employment of the Insane.—Dr. H. M. Hurd (Report of the Pontiac, Mich., Hospital for the Insane for 1882–83) says: "1st. Industrial pursuits of some sort need to be made more prominent as a curative agency in asylums. They are needed to give an outlet to the diseased activity of the insane and to divert energy which would otherwise be expended in acts of destruction, into healthful channels. They are above all needed if use of restraining apparatus is to be dispended with. It is not intended to discuss in this connection the question of restraint or non-restraint. An extreme position in favor of either must be regarded as unwise. At the same time all recognize the evils which flow from restraint and appreciate the necessity of reducing it to the lowsst possible figure. That restraint unwisely applied renders patients irritable, destructive, degraded in habits, and uncomfortable all will concede. If healthful employment can be substituted for restraint, in the majority of cases a very important point will be gained. That such is the case the experience of Scotch asylums has established. Non-restraint and employment must go hand in hand, each is impossible without the other. 2d. Many difficulties in the way of useful employment for insane people exist in the Michigan asylums which do not exist elsewhere. Among them may be briefly stated the fact that these asylums accommodate both private and dependent patients. This ought not to be an insurmountable obstacle. If employment is a remedial measure for the pauper patient, is it not equally so for private patient? It would seem practicable to prescribe it equally for all classes, although possibly not to the same extent. It is undeniable that the presence of private patients in asylums tends to complicate the problem materially. Another obstacle is to be found in the class of patients who come here. The vast majority have worked too continuously at home, and at first they need rest and quiet, nutritious food, and freedom from exposure and fatigue. Still, it is possible to employ without fatiguing, and there is less danger of exhaustion from systematic labor applied under the safeguards of medical supervision, than from the purposeless and perverted activity of insanity. 3d. It is impossible to give much variety to this occupation. Many fancy that under a perfect system of employment, the painter, the photographer, the tailor, the shoemaker, the upholsterer, the carpenter, the bricklayer, the lawyer, the minister, and the doctor, could all find em-

ployment each in his own avocation. This, however, is not feasible or desirable. It is preferable during the summer months to give all such employment as will keep them in the open air as much as possible; in the winter this employment should be such as can be carried on without undue exposure to the weather. Work upon the farm and in the garden will unquestionably be the best for men in the summer. For the winter there should be workshops, comfortably warmed, and well lighted, for the making of mattresses, the seating of chairs, the knitting of stockings, etc. For women the problem is a more difficult one. At present women occupy themselves as a rule much more regularly than men in sewing and in housework. Their occupations, however, are not in the open air, nor are they as invigorating to health as farming operations for men. Many women do not know how to sew, and to many the confinement to one position which such work entails is irksome. For such more active employment should be devised. Many undoubtedly would be benefitted by laundry work, if laundries were so arranged that women could work in them without contact with men. Many also would be able to prepare vegetables if kitchens were similarly arranged. With, however, the rule once established, that all persons physically able should employ themselves, it is extremely probable that sufficient work can be found. 4th. Employment of some sort should be made obligatory upon all able-bodied patients. This, of course, should not be compulsory, as in a penal establishment, nor should the idle person be coërced by physical penalties. It should, however, be the policy of the asylum to give favors to those who work, to furnish better apartments, better clothing, and greater privileges. Authority should also be given to pay trifling wages to those who require such an inducement. 5th. Many details in such a scheme remain to be worked out, and much preliminary work among the friends of patients, patients themselves, legislators even, and among attendants, will need to be done. Indeed it is to be feared that such measures would meet with much opposition from all quarters. At the same time it is his firm conviction that the future development and perfection of asylum methods lie in this direction. It might, consequently, be best to arrange at first for the employment of State patients, and to procure legislative sanction of the step. If this works advantageously it will be comparatively easy to extend the system to other patients. The above conclusions present the employment question in a clear light with all its difficulties. More than once has it happened in hospitals for the insane that friends of patients have

protested against the *cruelty* of putting their 'poor crazy son or father,' as the case might be, to work, and sensational outcries against the employment of the insane by no means unfrequently make their appearance in the public press. That insane of the private class can be induced to labor has been shown by Dr. Bower." *

Insane Suicides and Insurance Companies.—Dr. J. E. Macneill, in a recent paper, concludes: 1. An insane person cannot commit suicide. Suicide implies sanity. 2. A life-insurance company or association is liable upon a policy issued by it if the insured took his own life while insane, no matter what were the conditions in the policy against liability in case of suicide. 3. An insurance company or association cannot contract against liability for anything done by the insured while laboring under insanity. An insane person cannot make or violate a contract. 4. A condition in an insurance policy that the company or association will not be liable for death caused by suicide, "whether sane or insane," is a binding condition *only* against an act of self-murder committed while sane. The words "or insane" are entirely void. 5. The commission of the act of self-murder is not of itself evidence of insanity. The Illinois Attorney-General, Macartney, has recently said, commenting on these propositions and on the statement made that the proviso against suicide, sane or insane, threw a greater burden of proof on the relatives of the policy-holder; that the propositions first cited are sustained by all modern legal authorities. He could not, however, agree with the suggestion that the words in a policy of insurance stating, in substance, that the company or association should not be held liable for suicides committed while the insured was sane "*or insane*," would reserve to the company or association broader grounds of defense than if the words "or insane" were not in the policy, or that these words would throw the entire burden of proof upon those expecting to profit thereby. On the contrary, these words are utterly and entirely void, and valueless for any purpose. Of course, they do no harm, nor can they have any force under any circumstances. The corporation might as well use the word "dead" as "insane," so far as concerns any act of the person himself, for insanity is legal death as to acts of the individual. The attorney-general of Illinois said nothing about the right and wrong of crime (suicide) by a lunatic, for the very simple reason that this test is not recognized in Illinois, but the judges who recognize this test in homicidal cases would be as inconsistent here they as they are in other

civil cases involving insanity, and would not recognize it in case such an issue was raised by an insurance company. *

Natural or Artificial Deformity of the Skull; which?—We cite the following from the *Tribune:* At Gujrat in India is the tomb of a Mohammedan saint called Shah Daula, and it is asserted that idiotic children are frequently dedicated to the service of this shrine. At all events the poor little wretches with which the town is filled are employed by the attendant priests to go on begging tours through the Punjaub under the care of fakirs. From the peculiar contour of their heads and faces these idiots are called "Shah Daula's mice"; but whether they are born or manufactured idiots is, according to *The Civil and Military Gazette*, an open question. It is suspected that the "mice" owe their cramped and distorted heads to mechanical processes employed by their parents to qualify them for the service of the shrine. The Lieutenant-Governor of the Punjaub has just issued an order that whenever any of Shah Daula's mice are found at large without proper care and control, they shall be sent to the Lahore Lunatic Asylum. * * *

Paretic Dementia in the Female.—Dr. S. V. Clevenger, special pathologist of the Cook County Hospital for the Insane, read a paper on "Paretic Dementia in the Female" before the Chicago Medical Society, February 4th, 1884. He says that the frequency of paretic dementia among women compared with its occurrence among men, as given by various investigators, is as follows: Boyle, 1 to 8; Calmeil, 1 to 4; Hoffman, 1 to 8; Duchek, 1 to 9; Esquirol, 1 to 8; Parchappe, 1 to 5; Laségue, 2 to 9; Foville, 2 to 7; Falret, 1 to 6; Bucknill, 4 to 13; Boyd, 2 to 9; Griesinger, 1 to 10; Griesinger at Prague and Stephansfield, 1 to 4; Luys (higher classes only), 1 to 12; Marcé, 2 to 25; Krafft-Ebing, 1 to 8; Lange, 1 to 13; Jung, 2 to 7; Riva, 2 to 9; Tamburini, 2 to 9; Buccola, 1 to 5; Regis, 1 to 6; Mickle, 1 to 6; Kiernan, 1 to 6; Shew, 1 to 42; Cowles, 1 to 30; Lalor, 1 to 19; Bjornström, 1 to 7; Stearns, 1 to 7; Fisher, 1 to 5; Spitzka (private patients), 1 to 58; Schüle, 4 to 10; J. P. Gray, 1 to 8; Voisin, 1 to 8; Mendel, 1 to 10; Sander, 1 to 12; Austin, 1 to 14; Clouston, 2 to 11; Seppilli, 1 to 3; Verga, 1 to 3; Burman, 1 to 4; Sheppard, 1 to 5. The average proportion calculated from these thirty-nine authorities is about one to eight. Fuller reports from European and American asylums would doubtless show a different ratio. Neumann, from not having seen a single case, de-

nied the existence of paretic dementia among females. Dr. Clevenger found the proportion in his institution to be about to 2 to 7.

Sankey states, that the liability to this psychosis is in the following order: Males of the lower classes, males of the upper classes; females of the lower classes, females of the upper classes. He inclines to the belief that sexual excess plays a part in the production of the disease, but the cases cited by him show that there were, in addition to the sexual excesses, great vicissitudes. Sheppard agrees as to the liability, but is not certain about the sexual excess. Dickson favors the views of Sheppard and Sankey, but considers emotional mental strain as the great cause. Blandford concurs in this. Bucknill and Tuke take nearly the same ground. Luys, who favors Dickson's opinion, says that in existing social conditions males lead a much more active life than females. The social freedom of the male allows him to indulge in physical and intellectual excesses of all kinds, while females are limited in these respects, living more at home and not being subject to mental and emotional overstrain. Dr. Clevenger did not accept this last view, since the emotions preponderate in women, and even though carefully housed and cared for, nearly every woman has to bear at certain periods probably more tension of feeling in proportion to the mental qualities conferring endurance.

The researches of Buccola, Tamburini, Seppilli, Verga, and Regis tend to show that among the rural classes the affection is markedly less frequent in females than is the case among the civic population, and is much more frequent with the hand-to-mouth, trading and speculative classes, where the wife takes an active part in the business, than among the classes where she is confined at home. Ashe and Lalor find paretic dementia rare among the female Irish in the south of Ireland; and the greatest proportion of females to males in Ireland was that given by Stewart, the Superintendent of the Belfast Asylum. Griesinger and Austin agree in general with Luys. Mickle, Mendel, Spitzka, Kiernan, and Voisin's results tend in the same direction. It would appear from the suggestions of Krafft-Ebing, Seppilli, Buccola, Boyd, and Danillo that there is a marked relationship between the menopause and paretic dementia, the mental disturbance of this period predisposing to the psychosis; but when it is remembered how extensively the climacteric figures in medical literature as a cause for every form of insanity and other diseases, it cannot be charged with specially inducing paretic dementia in preference to other psychoses; then again this period is as liable to be co-incidental as causative. The prevalent type is the quiet form, which may account

for the infrequency of its observation by some authors. The contrast between the Connecticut asylums is probably to be accounted for in this way, as the one having the fewest female paretics is tenanted by a lower class of females than the other, many of whom come from the rural population; but the discrepancy is too great to be thus fully explained. Seppilli found about one of the ordinary to three of the quiet type. One of the latter kind recently died in Cook County Hospital for the Insane, and some peculiarities in her case justified its description. A thirty-seven-year-old Irish woman, married; very marked intemperance before insanity was noticed by friends. Father died of "consumption of the bowels"; mother died at sixty, paralyzed; had never borne children, nor menstruated; hereditary predisposition denied. October, 1881, furor appeared and lasted three weeks. She remained at hospital in Chicago till this abated, when a remission occurred, lasting till December 25th, 1881; when she had "cramps" lasting a week. She was sent to "Michigan State Retreat," where she remained until July, 1882. Little was known about the last remission, except that she was errabund. The first remission is stated to have been complete. Just prior to coming under Dr. C.'s observation, delusions of persecution were observed. Patient exhibited marked paretic symptoms, tremulous oral and lingual muscles, from admission. She had speech drawling, tremulous tongue, and felt extremely well and self-satisfied; had unsystematized delusions of grandeur; gave little or no trouble. August 30th, 1883, hemiplegia followed a convulsion, and she died next day without coming from stupor. Autopsy eight hours after death. Uterus very small, resembling that of a girl of sixteen; left ovary atrophied; os tincæ imperforate; vagina patulous and large. A third nipple well developed below left breast.

The brain weighed 39 oz. after preparation in solutions for microscopical examination, hence weights here given have only relative value. Cerebellum weighed $4\frac{4}{4}$ oz. Each hemisphere weighed within a few grains of $16\frac{3}{8}$ oz.; the left side, then, can be considered under weight. Cholesterin abundant, especially in occipito-basilar regions. Right antero-posterior diameter of medulla slightly less than left. Isthmus weighed an ounce. Vermis of cerebellum warped toward left side, causing left aspect of the organ to appear larger than that of the right. Cortex did not pull with pia loose from medullary substance (noted in some cases by Spitzka). In many parts of parietal and occipital regions, the pial adhesions were sufficient to bring away the outer layers of cortex, imparting the ragged ulcerated appearance to

which Rindfleisch called attention. Heterotopia found in anterior parietal region. Cortical pial adhesions occurred in the lowest extremity of right occipital lobe, with connective tissue proliferations filling widened sulci. This condition was extreme at base of first frontal convolutions on both sides; fibrous trabeculæ, clubbed and twisted, extended downward from pia, covering four to five square inches; filling interstices left by shrunken gyri and atrophied gray substance. In the white substance, external to the right lobulus cuneus, a cone-shaped area of yellow softening, with apex curved forward, was found, measuring one inch in length, tapering from three lines in diameter. It was apparently the colloidal necrobiosis of a thrombosed terminal branch of the posterior cerebral artery. The gelatinous contents of the cone were mixed with detritus of the degenerated blood-vessel. Sections microscopically examined afforded views of kinked and distorted vascular channels, often twisted glomerularly. Knobbed vessels were frequent, and knobbed perivascular spaces more so; some clear, others dotted with granular masses. Evidences of capillary stasis, general and decided, while dark bodies, resembling embryo connective tissue corpuscles, abounded. No well-defined Meynert "spider-shaped cells" were discovered. The ganglionic elements were shrunken and their processes illy defined; a few large nerve cells with granule contents were observed lying in clear spaces, as though contracted from areas they once filled. Sclerosed patches abounded in the sections examined. With the exception of the lesions in the bregmatic region, the post Rolandic parts were mainly involved. The ventricular endyma was nodulated in parts, showing the "ground glass" appearance. Comparatively few healthy ganglionic bodies were discerned in over a hundred sections taken from different parts of the cerebrum. It must be obvious from the teratological findings that the case was an impure one; either original imbecility or primary monomania complicated by paretic dementia, and the history obtained after the autopsy showed the patient to have been a congenital moral imbecile.

A discussion followed, in which Dr. Kiernan, while agreeing in many respects with Dr. Clevenger, held that mental overstrain was not as marked among women as among men. The emotions of hope and fear in pecuniary matters were not excited in them. In countries as in France, among the middle classes the woman was admitted to an equality in business transactions, the wife being often *the* business manager, and as a natural result paretic dementia was relatively frequent among such women. It might

be said that the French were immoral, but this was simply cant, since the middle class women were in every country the least immoral. That the menopause acted as a predisposing cause seemed to Dr. Kiernan at least probable, since the menopause produced marked vaso-motor disturbance, and it was at the menopause that paretic dementia was most frequent in women. It was a favorite theory with many that alcohol was responsible for paretic dementia, and he heard certain statistics collected by himself cited as evidence of the influence of alcohol. Thus out of 160 paretic dements in the New York City Asylum for the Insane, 116 were of intemperate habits; was this intemperance the result of the psychosis or its cause? Dr. Kiernan fully believed in the great majority of cases the first, and he was personally acquainted with every one of these 160 paretic dements. Even the most bigoted celtophilist could not deny that the Celtic Irish in Ireland were intemperate, yet paretic dementia was infrequent among them there; but the reverse was true in the United States. In the last case they were exposed to unwonted mental strain. A physician of Berbice, British Guiana, had had experience which pointed in the same direction. Sexual and alcohol excess were frequent in Guiana, but mental strain was replaced by a *dolce far niente* condition. He had met with but a single paretic dement; a European who had brought the psychosis from Europe.

Dr. Tilley thought that there was less emotional strain among the mechanics than would seem to be indicated by Dr. Kiernan's remarks. A man living on regular wages was not likely to be a subject of mental strain. The Irish in Ireland led a hand-to-mouth life.

Dr. Clevenger said that he believed syphilis, either acquired or congenital, was the great cause of paretic dementia. In his opinion, the menopause could not be considered as having more than a coincidental relation with paretic dementia. He was aware that Austin had laid stress on emotional strain as a cause of paretic dementia, but the fact that the patients in many instances could be shown to have either acquired or congenital syphilis, and in many other instances presumptive evidence was obtainable, led him to the opinion mentioned.

Dr. Kiernan said that the opinion expressed by Dr. Clevenger respecting the etiological influence of syphilis had been previously independently maintained by Esmarch, Jessen, and Kjellberg, who claim that paretic dementia is always due to syphilis. Kjellberg's words are that paretic dementia never occurs in a subject free from congenital or acquired syphilis. Mendel has shown that

syphilis in the parent may produce a predisposition to insanity in the offspring, such insanity occurring long after the usual syphilitic congenital manifestations attain their full development. On the other hand, Lewin and Fournier claim that paretic dementia never arises from syphilis. Lewin's opinion is an opinion merely, and is entirely too dogmatic, for he denies that any psychosis can be produced by syphilis. Fournier claims that syphilis produces a pseudo-paretic dementia not identical clinically or pathologically with the real psychosis. Syphilis was not so infrequent in the female as would seem to be indicated by the infrequency of paretic dementia, supposing lues to be the cause of that psychosis. The infrequency of paretic dementia among females was, therefore, an argument against the luetic origin of all cases of paretic dementia. He would like to ask Dr. Clevenger if he believed the existence of lues was an element of prognosis.

Dr. Clevenger said he did not consider it a neccssary indication of prognosis, nor even of treatment; he had given mercury with effect in paretic dementia, but purely on the deobstruent principle.

Dr. Kiernan said it was a favorite theory with many that curability was a test of a luetic etiology. Müller denied the value of such a test, and Breshfield says that, in the more chronic syphiloneuroses where the syphilitic deposit has itself undergone degeneration, changes, and established secondary changes in the surrounding nerve-matter, treatment will of necessity be of very little avail, and this was the opinion of most syphilographers.

Dr. Clevenger said that his case presented a point of interest, which had not received sufficient attention. The patient prior to the inception of the paretic dementia was a congenital imbecile. On a teratologically defective brain were superimposed pathological processes. To this condition of things Hösterman was the first to call attention, and cases similar in character had been reported by Christian, Spitzka, C. F. Folsom, Kiernan, and others. In Folsom's opinion, Guiteau was a case of this kind. There could be no doubt that a defective brain predisposed to pathological changes. For the reasons already given by Dr. Kiernan, he did not lay special stress on anti-luetic treatment. Paretic dementia is an affection characterized by early vaso-motor disturbance and subsequent encephalitic changes, and it may exist without any discernible lesion in its early stages. Rabenau has found many cases in which this occurred. Spitzka is of like opinion. It is obvious, therefore, that the encephalitic changes are the later consequences of the disease, and this is further shown by the oc-

currence of remissions, in which the patient's normal condition is seemingly restored. Vaso-motor changes are at the basis of this encephalitis, and what could be more potent in the induction of these changes than the direct or irritative influence of gummata in certain localities? This is the opinion of Luys, who says that, "if, as a rule, syphilis marks its passage through the organism by sclerotic productions and gummy tumors, it is not impossible that syphilis may reveal itself in certain cases only by a sclerotic hyperplasia, to all seeming a simple hyperplasia. I say the thing is not impossible, for, up to the present, the anatomo-diagnostic characters between non-syphilitic and syphilitic scleroses are not so firmly established as to permit the clinical recognition of a syphilitic type of progressive paresis." This being the condition of things, it must be obvious that anti-luetic treatment tested nothing; it could not remove the gummata or the secondary changes set up by them. On the other hand, Spitzka claims that, in cases where syphilis can be positively excluded, mercurial treatment is sometimes of value. Without conceding the incorrectness of his view, Dr. Clevenger was prepared to admit, if such cases existed, they might be benefited by mercurial treatment. *

Simulating Criminals.—It appears that the simulation of insanity has become almost systematized by a dangerous class of Berlin criminals. The subjects call the procedure "playing wild-man." Five of them were transported to the *maison de santé* at Schöneberg for observation, and organized a revolt; failing in an attempt to escape, they undertook to ignite the building, hoping to leave it in the ensuing confusion. The superintendent, however, called on the commander of the railroad regiment (a body of engineers and sappers having a regimental organization) and requested him to guard all the approaches. The fire was quickly extinguished, the four conspirators were taken, and two real lunatics escaped, to be captured, later in the day, at Nowawess. A few days prior, two female prisoners who shammed effected their escape. * * *

Tractus interradicularis pontis.—In most subjects we have recently examined, a well-marked bundle of fibres was noticed in the pons which, instead of running the ordinary transverse course of the major part of the superficial fasciculi, runs longitudinally. This fact, in itself, has been noted by anatomists, but the singular relations of the bundle to certain important nerve roots seem to

have escaped them. It extends from the region where the eighth and seventh pairs enter the brain axis to the origin of the sensory root of the trigeminus, and to the naked eye it appears as if the roots of all these nerves received fibres from it. In one subject, remarkable for the deep plastic moulding of all the axial contours, in whom the *tractus transversus pedunculi*, the middle geniculate ganglion, etc., were unusually well marked, this fibre bundle was so distinct as to seem to merit a separate designation and we propose to term it the *interradicular pons tract.* In other subjects, the innermost fibres of this tract leave their original direction to become transverse. Sometimes it has, in part, a gray color. E. C. S.

Spinal Irritation.—Much has been recently written on this subject by younger neurologists, and the impression seems to prevail that the discovery of the cerebral origin of spinal irritation, railway-spine, and allied symptom groups is a recent one. It is scarcely accurate to speak of a cerebral origin, better say a cerebral seat; for we know as much as nothing of the true origin of these disorders. We are in the dark about them, as we are in the dark about hysteria; but the earliest writers, Robert Whytt, Isenflamm, and others, repeatedly call attention to the cerebral character of many of them. Two of the editors of this JOURNAL have for years agreed to call the disorder, ordinarily termed spinal exhaustion and irritation, cerebro-spinal exhaustion and irritation.

There is a tendency with some recent writers to go to the extreme of considering these disorders to be exclusively cerebral. This is not reasonable. Some of the symptoms are of a characteristic spinal type, and many simulate the signs of organic spinal disease. The reality of many of the symptoms, fostered though others may be, by the irregular mental state of the patient, cannot be doubted. We have seen the gums shrink back from all the teeth on one side of the upper maxillary bone, leading to the absorption of the alveoli, so that the teeth dropped out. Deformities of the joints simulating those of arthritis deformans were witnessed in the same case. Blotches on the skin, sudden vaso-motor disturbances, bladder irritation, nodular growths under the skin, appearing and disappearing with great rapidity, are all among the symptoms we have noted, and been puzzled by in this singular group of nervous disorders. E. C. S.

Recessus facialis.—We propose this name for a fossa found at the lateral aspect of the oblongata and on the posterior face of the pons. It is produced by the pontine overlap, and roofed in

by the underface of the restiform column and fibres of the auditory root. It is a very characteristic feature of sections made transversely through the posterior edge of the pons, and in those striking the apex of the true olive. In such sections, three gaps are noted—a middle and two lateral ones. The middle one is the post-pontinal fossa, the two lateral ones are the facial recesses. This name is given because the facial nerve enters the recess, either skirting or partly imbedded in the substance of the pons. It is an important region from its relations to the nerve roots, and in one case we found it the seat of a neoplasm. E. C. S.

Brevities from Practice.—*Epilepsy.* In a case now under observation in which heredity was marked, the exciting cause of the first fit being a fright, it was noted that complete isolation checked the fits radically, they being in every instance provoked by explosions of the epileptic temper. The fits were of the true epileptic character. Two cases of epilepsy in which the fits were not accompanied by complete loss of consciousness have been seen within the quarter, and in one the aura is sufficiently long to permit the abortive use of nitrite of amyl.

Chorea. An unusual proportion of children, presenting a predominance of paretic over the irritative phenomena of chorea, has come under observation this spring. In all cases, the arsenic treatment failed in the most humiliating way, while the expectant plan and bromide treatment were very successful—if success can be spoken of in this self-limiting affection. Of eleven cases, one had had genuine acute articular rheumatism.

Axial Disease. In a case of syphilitic neoplasm or syphilitic arteritis of the pons and medulla, located by the reporter in the tegmental division of the posterior part of the pons, the following singular condition of the oculo-motor innervation was noted: Motion of both globes entirely normal, upward, downward, and in all intermediate directions, except in the horizontal. No movement was possible to the right beyond frontal fixation, while to the left movement was possible to the full extent, but accompanied by extreme nystagmic oscillation. Other symptoms resembling those of B—— described in the last issue of the JOURNAL were noted. The interesting case will be described in full by Dr. Seneca Powell when the record is completed.

Paretic Dementia. In a case of this disorder (quiet type, premature senility) observed with a colleague, there were made two careful examinations of the patellar reflex, at an interval of four days. On the first occasion, the right patellar reflex was normal, and the left diminished; on the second, the left was readily elicited, the right only obtainable with difficulty, then being of slight extent. It appears that the period covered by extreme changes in this reflex is often very brief. E. C. S.

NERVOUS AND MENTAL PHYSICS.[1]

BY

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IMPRESSED with the fact that everything in our intellectual lives depends on or grows out of our sensations, David Hartley, a disciple of Locke, addressed himself to a study of the mental mechanism in the last century, when the anatomy and physiology of the nervous system were but imperfectly known.

The Aristotelian dictum which recognized the dependence of intellect upon the senses, until Hartley's day stimulated but few efforts to explain the intimate workings of animal machinery through direct study of its parts.

The surmises of Descartes and Hume were excellent, but Hartley's[2] inferences from observations of nervous physiology are unparalleled, considering the crude knowledge of his time. His theory of vibrations was an application of Sir Isaac Newton's, whose personal acquaintance he enjoyed.

Dr. J. S. Jewell,[3] in a review of Hartley's work, incidentally writes as follows, and his words will be indorsed by every physiologist with breadth of mind enough to look beyond section cutting on the one hand and metaphysical obscurations on the other:

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[1] Recorded as read by title at the meeting of the American Neurological Association, New York City, June 17th, 1884.

[2] Observations on Man; His Frame, His Duty, and His Expectations, pp. 756. London, 1749.

[3] Chicago Journal of Nervous and Mental Disease, July, 1875, p. 400.

"His example, among a few others, serves to show the value of analytical reflection on even a few facts, and of a cautious use of hypothesis. There is a decided disposition in certain quarters to-day to decry the results of reflection on facts, when these results go at all beyond the facts, and even a legitimate use of hypothesis, as a return to the follies of the dark ages. And we are led to speak of this spirit with all the more propriety because it must always be true, so far as can be judged at present, that there will be domains of the nervous system, in a measure inaccessible to experimental research, and into which we must penetrate, if at all, guided by the hand of inference; and this mode of procedure, if the one who employs it be fully aware of its dangers, is a perfectly legitimate one.

"By what means did Hartley arrive at so many just views in respect to the difficult subject on which he wrote? Simply by doing what his illustrious master, Newton, did when he discovered the law of gravitation, by patient reflection on a fact so simple as the fall of an apple; which fact, common as it was and is, involves really the law, which by generalization was seen to extend its jurisdiction throughout the visible universe. Even so it was with Hartley. Reflecting cautiously and patiently on the few facts that he had accumulated, and aided by an ingenious theory, he was able to declare in fair outline the structure and probable modes of action of important parts of the nervous system, as legitimate deductions from rational premises. If so much could be done by Hartley on the basis of so few ascertained facts, guided by a cautious but free use of inference, what might not be done to-day when such multitudes of facts await in incoherent masses the hand of patient critical reflection? We are as well aware as we can be that we are proclaiming no new truth, nor recommending any new practice when we declare that the greatest need in the sphere of the natural and physical sciences of to-day is not less experimentative power, but more and better balanced thought, or more logical reflective power and a freer, because a more rational use of *inference*. And we are ready to justify our remarks when we say, that there is a well-marked loss of balance now existing in the general movement of science, in favor of experimentation, as against critical thought on its methods and results. And in no other department of human effort is this state of things more conspicuous or its results more deplorable than in that of medicine."

Had Lord Brougham's sneers been less effective, the

deductions of Dr. Thomas Young would have been less discouraged, and physical science been advanced far beyond where Young left it. Through the inferences of Bouvard upon the perturbations of Uranus, Neptune was discovered. Observation alone could never have afforded knowledge of that planet. The coast survey cadets are noted for the rapidity and accuracy with which they think in physical and mathematical terms. If Professor Hilgard, of that service, were to select one of these cadets least biased in the directions Herbert Spencer points out as antagonistic to correct insight into nature, and have him thoroughly trained in neurological matters with the necessary preliminaries, such a mind, however otherwise mediocre, could not fail to see likenesses and connections, and deduce laws from the jumble of experiments the multitude of physiologists may strive in vain to know. Psychology above all things needs philosophical methods, the unification of the knowledge of its many aspects. To Herbert Spencer we are indebted for a correct synthetical method, and however widely of the mark he may have fallen in many instances through the necessity of his plan in seeking ultimates, the ground work of Spencer's Synthetic Philosophy will inspire thinkers to the end of time.

In his data of psychology[1] he reviews the structure and functions of the nervous system, the conditions essential to nervous action, æstho-physiology, and the scope of psychology. We may advantageously epitomize some of the points he urges.

"While the rudimentary nervous system, consisting of a few threads and minute centres, is very much scattered, its increase of relative size and increase of complexity go hand in hand with increased concentration and increased multiplicity and variety of connections.

"Isomerism seems to be the molecular changè undergone in nerve activity.

[1] Principles of Psychology, vol. I., chap. i. to vii.

"Gray matter contains five times as many capillaries as white (based on cubed averages from Kölliker's plates); from this he infers greater composition and decomposition in gray areas.

"Conditions essential to nervous action are:

"Continuity of nerve substance.

"Absence of much pressure.

"Heat kept above a certain level, limited.

"Suitable quantity and quality of blood supply.

"Minimum presence in blood of CO_2, urea, and other toxic agents.

"Waste must be fully met by repair.

"Nerve is not capable of continuous stimulation or continuous discharge.

"The transmission of a disturbance through a nerve takes an appreciable time.

"Every wave of isomeric transformation passing along a nerve-fibre entails on it a momentary unfitness to convey another wave, and it recovers its fitness only when its lost molecular motion has been replaced, and its unstable state thus restored.

"Every part of the nervous system is every instant traversed by waves of molecular change—here strong and there feeble. There is a universal reverberation of secondary waves induced by the primary waves now arising in this place and now in that, and each nervous act helps to excite the general vital processes while it achieves some particular vital process. The recognition of this fact discloses a much closer kinship between the functions of the nervous system and the organic functions at large than appears on the surface. Though unlike the pulses of the blood in many respects, these pulses of molecular motion are like them in being perpetually generated and diffused throughout the body, and they are also like them in this, that the centrifugal waves are comparatively strong, while the centripetal waves are comparatively feeble. To which analogies must be added the no less striking one that the performance of its office by every part of the body, down even to the smallest, just as much depends on the local gushes of nervous energy as it depends on the local gushes of blood.

"Higher animals possess greater self-mobility.

"Whenever much motion is evolved, a relatively large nervous system exists.

"Whenever the motion evolved, though not great in quantity, is heterogeneous in kind, a relatively larger nervous system exists.

"Whenever the evolved motion is both great in quantity and heterogeneous in kind, the *largest* nervous systems exist.

"Stimuli of all orders produce effects alike for like nerves."

We may safely posit what has here been quoted, the isomerism of nerve substance excepted, as needing more defence, though satisfying many requirements. Certainly more than Luy's[1] "organic phosphorescence" which with sensibility and automatism he classifies as fundamental properties of the nervous elements. Bucknill[2] justly lampoons Luy's fanciful psychology, but takes too pessimistic a view of the possibility of elucidating cerebral phenomena on the basis of vibrations. Few have shown the catholicity of Spencer in biological philosophy, and it would be well for every investigator to imbibe some of his spirit before advancing or condemning theories of mental action. Hume would rejoice in the immensity of psychological data we to-day possess, based upon dimensions and intervals of time, but which sadly need a Copernicus or Newton to assimilate them. Even though lesser intellects may fail to evolve ultimates from an attentive study of these numerical relations, nothing will ever be achieved by their neglect, while occasionally discoveries of value will reward attempts to reconcile apparently disconnected facts.

So far as objective phenomena are concerned, the vibratory theory affords the only practical and satisfactory explanation of universal phenomena to chemists, electricians, and physicists generally. Millions of dollars are daily invested by capitalists upon the accuracy of deductions from the vibratory theory in the mercantile fields of telegraphy, telephony, optics, chemistry, music, etc. I hope that this article may stimulate physiologists, with the necessary physical apparatus and other means, to a re-examination of psychical matters in their relations to the many physical laws which have been so thoroughly worked out.

Schwalbe[3] affirms laws regulating the size of nerve-fibres. He found a basis of classification in Remak's observations upon the gelatinous fibres, and a physiological distinction, *e. g.*, motor and or sensitive, influences the size of the fibres, and he adopts M. Pierret's law that the size of the cell and thickness of the nerve roots are regulated by the distance at which its nervous influence is exerted, corresponding to Dieter's claim that the size of the cell is in proportion to the thickness of the proceeding axis cylinder. The brain exhibits fewer size variations than the spinal cord. These variations, Schwalbe states, have reference to the

[1] The Brain and its Functions. International Sci. Series, London, 1881.

[2] Brain, Oct., 1882, p. 381.

[3] On the Relations of the Calibre of Nerve-Fibres. Leipzig, 1882.

size of the animal, extent of distribution, physiological attributes of the nerve, and amount of usage to which it ministers.

Vulpian[1] argues that the dimensions of motor and sensory cells are in direct proportion to the distance over which their motor or sensory impulses must travel and he formulates two terms. 1. The length of the nerves in relation to the cells. 2. The distance between the cells of first reflection and their analogues in the cortex.

Spitzka,[2] discussing the erroneous notion that function and cell-size were related, is willing to predicate for the so-called motor cell but one character, "that the transition from the body to the processes is so gradual that it is difficult to say when the body ends and the process begins, while in unquestionably sensory cells the transition is always abrupt." Although in some areas sensory cells are larger than adjacent motor cells, as a general rule the motor cell is relatively larger than neighboring sensory cells; but, as Spitzka shows, this must be accepted with reservations.

Hoffman[3] affords us some careful measurements of nuclei, nerve cells and fibrillæ, but, in common with Spitzka, Ranvier, Meynert, and other exact observers, affirms nothing on the strength of mere size.

The nervous system does not differ materially from other tissues in development. Heterogeneity of function brings about a quantitative rather than a qualitative increase, and the only relationship between size and function in my opinion is a nutritional one, *cæteris paribus*, thick axis cylinders afford less resistance than thin ones, and *use either in frequency or intensity, or both, would determine sizes between nerve-cells and fibrillæ of the same ages, lengths, locacations, etc., without regard to motor or sensory differentiation.*

The great similarity between terminal fibres in their distribution to various organs, muscular, glandular, etc., admit of no other explanation than that the work accomplished by nerves does not depend so much upon the kind of stimulus or nature of the nerve elements as upon the character of, and possibilities inherent in, the non-nervous organs to which they are related.

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[1] L'Union Médicale. June, 1877.

[2] Chicago Journal of Nervous and Mental Disease. April, 1881, p. 325.

[3] JOURNAL OF NEUROLOGY AND PSYCHIATRY. August, 1883.

Of the numerous hypotheses of nerve action, for reasons subsequently given, a combination of the mechanical and chemical, the molar and molecular motions seems to satisfy most requirements. We learn from the methods of Kepler used in working out his three planetary laws that his "cut and try" plan, essentially the *reductio ad absurdum*, brought him to consistent rules which could no longer be argued against. A generous share of the past ten years I have devoted to the problem of nerve energy and early realized the futility of any other way of solution than the Keplerian combined with the inductive from as extensive a range of collateral study as possible.

There are analogies between the premises from which the olden astronomer argued, and those of the modern neurologist. Certain luminous points moved in apparently erratic paths, and the times of these movements were tabulated. Measurable nerve elements are traversed by impulses moving in determinate times and definite directions, the nature of the changes incidental to nerve motion being unknown.

The first appearance of contractile tissue left the primitive animal mass responsive to undifferentiated motions and sensations. Every jar or impact, every change of temperature or transition of light and shade, acted to stimulate the rudimentary muscular tissue. Adjustment to the environment determined to which of these stimuli response would be most apt to occur, precisely such adjustment and readjustment as man in common with other animals undergoes daily. Definite sarcodal contractions were followed by the definition of a path for stimuli through least resistance lines.

Kleinenburg's neuro-muscular development of hydra Huxley[1] mentions as internuncial, and the primitive form of a nerve.

[1] Anatomy of Invertebrated Animals, 1878, p. 62.

Eimer[1] observed in the Ctenophora, the mesoderm traversed in all directions by very fine fibrils varying in diameter from $\frac{1}{30000}$ to $\frac{1}{12500}$ of an inch. These fibrils take a straight course, branch dichotomously, and end in still finer filaments, which also divide but become no smaller. They terminate partly in ganglionic cells, partly in muscular fibres, and partly in the cells of the ectoderm and endoderm. Many of the nerve-fibrils take a longitudinal course beneath the centre of each series of paddles, and these are accompanied by ganglionic cells which become particularly abundant toward the aboral end of each series. The eight bands meet in a central tract at the aboral pole of the body; but Eimer doubts the nervous nature of the cellular mass which lies beneath the lithocyst and supports the eye-spots. (*En passant*, this dichotomy of nerve-fibrils agrees with Schultze's observations.[2]) Hubrecht[3] describes a new worm, "Pseudonematon nervosum, without trace of sexual, excretory, or sensory organs, with three muscular layers, consisting of a thick external longitudinal, a middle transverse or circular, and an internal longitudinal layer. The nervous system forms a continuous layer completely around the body, lying immediately inside the layer of muscular fibres. It consists of (1) a fine network of delicate filaments, appearing as if felted, barely tinged by the staining reagents, and (2) of scattered nuclei belonging partly to connective tissue, partly to ganglion cells. The layer forms a continuous tube from the head, where there is no ganglionic enlargement, back through the body to the caudal region, where the layer is present dorsally only."

Darwin's[4] ascription of intelligence to earth worms does not involve the organization of a sensory distribution. Sounds produce waves in the undifferentiated sensorium, and alter the usual molecular interchanges. Light stimulates the cerebral ganglia of the worm without the intervention of a sense organ, owing to its diaphanous skin. Darwin finds evidences of olfactory and gustatory appreciation, but the tactile sense is the main one.

Gegenbauer[5] assigns a high development of tactile sense organs to vermes, but the visual organs of different species afford evolutionary variations. Those of the rotatoria are placed directly

[1] Zoologische Studien auf Capri, Leipsic, 1873.

[2] Archiv für Anatomie und Physiologie, 1878.

[3] American Naturalist, May, 1884, p. 546.

[4] Formation of Vegetable Moulds through the Action of Worms, with Observations on their Habits, 1883.

[5] Comparative Anatomy: Bell and Lankester tr., 1878, p. 152.

upon the cerebrum with a crystalline rod to each pigment spot, or the latter is present alone. Among cœlenterata, spongiæ have no sensory organs, neither have the low forms of acalaphæ. The cellular layer of the hydroid polyps is an undifferentiated organ of sensation.

Balfour[1] states that "embryological evidence shows that the ganglion cells of the central part of the nervous system are originally derived from the simple undifferentiated epithelial cells of the surface of the body, while the central nervous system itself has arisen from the concentration of such cells in special tracts.

"The nervous system of the higher metazoa appears to have been evolved in the course of a long series of generations from a differentiation of some of the superficial epithelial cells of the body, though it is possible that some parts of the system may have been formed by a differentiation of the alimentary epithelium.

"An early feature of the differentiation consisted in the growth of a series of delicate processes of the inner ends of certain epithelial cells, which became at the same time specially differentiated as sense cells.

"These processes gave rise to a sub-epithelial nervous plexus in which ganglion cells, formed from sense cells which travelled inwards and lost their epithelial character, soon formed an important part.

"The central nervous system was at first continuous with the epidermis, but became separated from it, and travelled inwards."

Nerves, such as we find them in the higher types, originated from special differentiations of the nervous net-work radiating from the parts of the central nervous system.

Balfour admits two points as obscure:

1. "The steps by which the protoplasmic processes from the primitive epidermic cells became united together so as to form a network of nerve-fibres, placing the various parts of the body in nervous communication.

2. "The process by which nerves become connected with muscles, so that a stimulus received by a nerve cell could be communicated to and cause a contraction in a muscle. The primitive relations between the nervous network and the muscular cells are matters of pure speculation."

It has often occurred to me that reasoning from analo-

[1] Comparative Embryology, 1881, p. 333.

gies would afford clues otherwise unattainable. It is incontestable that the proper phosphorized protagonous composition was acquired by ingestion; it lay in the environment of the low metazoon, and just as the shell of the snail, or more palpably, the envelope of foraminifera was excreted, so these explosive compounds were externally, ectodermally diffused, and, being acted upon by extrinsic forces in lines of least resistance, became useful in discrimination as the shell became protective, and we see every evidence of the tendency of animals to perpetuate and develop and differentiate organs which may have arisen, and in all probability did arise, accidentally.

The pigment spots in vermes becoming points of special irritation develop into eyes, but the sinking in of the sense organs and final superimposition of similarly excitable cells linearly until definite connections were made shows how the sensory differentiation occurred.

We can then assume that special chemical alterations occurring peripherally were appreciated centrally in terms of general sensation, that is, where previously jars and comparatively coarse waves served as stimuli, light vibrations, through chemical decomposition of pigment, brought about the primitive irritability constituting sight.

"The nervous system being derived from the epiblast implies that the functions of the central nervous system which were originally taken by the whole skin became gradually concentrated in a special part of the skin, which was step by step removed from the surface, and has finally become in the higher types a well-defined organ embedded in the subdermal tissues." (Op. cit.)

In the division of labor by the tissues, many portions fall below the average irritability by changes in chemical inaptitudes, and protoplasmic parts most exposed to vibratory impacts not only preserved the original sensitiveness, but developed it, as every organ is developed by use, perpetuating what is useful, and eliminating the useless.

Above the planula stage we have eminently contractile tissue aggregating in certain parts, and in others cells resisting differentiation in other than assimilative directions, the highly irritable ectodermal eventually forming the cerebro-spinal axis. At this period, internuncial fibres, such as nerves, arising in a plexiform manner, would fall into directions regulated by lines of least resistance, definite motions being the end toward which definite structures tended. Muscular tissue is that structure which, preserving much irritability, developed its contractile powers, and became more efficient through linear arrangement of its cells and their connection with tissues of some degree of induration. The contiguity of the highly sensitive tissue enabled possible conveyance toward the contractile of stimulation from distant parts of the body. This is the neuro-muscular system *in futuro.* It is well not to mistake words for things, and not designate nerves at this stage as sensory or motor, for the two functions seem combined and inseparable. Vibrations are conveyed better by the rudimentary nervous tissue, and contraction of the rudimentary muscle is the result. Such peripheral points as pigment spots, through chemical susceptibility greater than had been heretofore apparent in the body mass, enabled the sensitive tissue to take cognizance of new irritations such as light waves, through the conversion of such waves *into terms of general sensitiveness.* An all-important consideration, and one whose elaboration will assist clear ideas of neural differentiation. In learning the Morse code of telegraphy, the dots and dashes arranged to indicate letters are learned as indicating words or impressions, knowledge of which was previously acquired. While the dot and dash sounds were not new to the ear, their definite arrangement brought us *en rapport* with a new experience correlated with pre-existing appreciations. Sunlight existed and influenced the protozoon,

but as soon as the pigment appearance produced new terms for old sensations, a revival of former currents through a new influence, the recently acquired peripheral chemical change readjusted the life possibilities of the animal, appreciation of light and shade became possible, *interruptions* of the molecular changes thus induced by association with food acquiring, or enemy escaping motions through use and natural selection grew to the extended importance it possesses in metazoon existence. The pre-existing neural irritability was not changed, but brought through peripherally increased susceptibility into new relations. We find on every hand a justification for this analogical reasoning. Whenever a new discovery or invention extends the range of man's abilities, it does not change the organism, but renders it capable of new applications of pre-existing potencies.

The rapidity of impact may modify subjacent structure so as to change the density of the conveying nerve, but the close resemblance of all nervous tissue precludes the idea of *any great change* being wrought in the nerve elements proper through change in peripheral sensibility.

The translation into terms of nerve appreciation must be peripheral as it is initially there brought into relation with the former general sensibility. It is not necessary to consider the organ as subsequently dipping below, and becoming continuous from skin to central system, and mature differentiation shows us structurally that the centripetal nerves do not admit of this supposition. They may undergo slight modifications due to the times of impulses, but in the main do not differ from centrifugal nerves.

We have every reason to believe that the neuroglia is allied to the original undifferentiated irritable protoplasm, notwithstanding Huguenin[1] "a tissue which increases as mental functions decrease cannot be the medium of such

[1] Allg. Pathologie der Krankheiten des Nervensystems, Zurich, 1873.

functions," for as differentiations of this basis substance occurred in a higher scale of intelligence, it is the very substance of all others to be encroached upon by organization.

The contractions and expansions of masses through changes in density by aggregation and seggregation of molecules are familiar chemical reactions. That identical molecular translocations constituted the irritability and automatism of living protoplasm we have every reason to believe.

The development of the aggregating and seggregating instability in either direction would inevitably cause a separation of such over susceptible molecules from the general mass. The eminently aggregative molecules are the muscular. The eminently seggregative molecules are the nervous, and both of these are developed from the irritable protoplasm, which as the neuroglia separates off into ganglionic areas, and through preservation of the original irritability (antagonistic seggregative and aggregative molecular power) and elimination of interfering matters it has become the seat of the feelings, the meeting place of the sensations, the part to which waves converge, and from which they diverge in the institution of vital movement.

The general sensibility which guides the muscular contractions when the central nervous system became the seat of general sensibility, its connection with the muscular system would follow, and whenever exaltation of sensibility occurred in any area, centripetal connection with the seat of general sensibility would also follow. We can safely grant the primitive central neuroglia, such as the amphioxine, a general susceptibility with a fixed range of mechanical and chemical irritability, the gelatinous quivers and molecular motions which *necessarily* occur as conditions of its existence.

The motor nerves respond to a definite group of these vibrations through habit and adjustment. No matter how these vibrations may be produced, we know that when they occur they stimulate the muscles to contraction. The uniform range of vibrations within the compass of the protoplasm producing muscular movements necessitated the removal of motor nerves from chances of passing stimuli, and hence the motor nerves in highly organized animals are related to the central nervous system, but not to the periphery. The advantages of this are apparent. The limited field of disturbance to which the cerebro-spinal axis or the protoplasmic basis substance was subject served the motor nerves as a cut-off for impressions.

The somatic motions are innumerable, but may be grouped as molar and chemical. The molar motions are the circulatory, and those made by the limbs and body generally in locomotion, prehension, or any other change of relative position of parts of the body, regarded by Goethe as comprehending all that animals could do.

The atomic interchanges which occur in every cell of the body produce chemical movements of complex natures. Respiration, in the conversion of hæmoglobin into oxyhæmoglobin, is chemical, and in muscle and nerve this respiratory function is evident. Oxygenation of the tissues is an accompaniment of life in all cells. It is a nutritive act, and the significance of oxygenation is no greater in the nerve areas, than it is in other organs. Hence oxygen, though necessary to nerve action, does not impart that action, but contributes to it, renders it possible.

The multitude of molar and chemical motions in the body produce a great number of vibratory waves in all tissues. Differences of temperature between parts induce circulations of heat waves. Differences in acidity and alkalinity with osmosis doubtless induce electrical changes, but none of these movements can be said to be the nervous

force. If we consider the nerve elements as unstable and readily stimulated into activity, we cannot ignore the myriad stimuli of every movement of life, awake or asleep.

Muscle and nerve irritability since the day of Haller[1] have been systematically investigated by Weber,[2] Du Bois-Reymond,[3] Helmholz,[4] Pflüger,[5] Kuehne,[6] and others agreeing in results with the views of Grünhagen,[7] Luchsinger, etc.,[8] that conductibility of nerves depends upon propagation of excitement from one molecule to another. Du Bois-Reymond's pre-existent theory refers to electric polarity of the molecules, in accounting for electrical excitation, but electricity is one mode of stimulation, while the nerve responds to various other stimuli, and it is not proven that the electrical is the force which normally works. Physicists generally concede that *everything* conducts electricity, Tyndall especially urges this, and that even the so-called insulators are relatively poorer conductors, but nevertheless susceptible to electrical currents.

It may be granted that electricity is one of the energies under consideration, within definite limits, as is the case with varying degrees of heat, with which the body in general, and nerve elements have established adjusted relations, and before proceeding further, it would be well to examine this perpetually recurring matter of adjustment and readjustment.

We experience impressions, sensations, resolvable into vibrations, which are novel and provoke reflex or other motions. Often repeated, these vibrations cease to produce the first effect, "we grow accustomed to them" suffices generally as an explanation, but to the physiologist that should be no explanation. The only inference to be made from analogy is that in this failure of repeated sti-

[1] De Part. Corp. Hum. sent. et irritabilibus, 1753.
[2] Muskelbewegung, Wagner's Handwörterbuch.
[3] Gesammelte Abhandlungen z. Allg. Muskel- und Nerven-Physik, 1875–77.
[4] Miller's Archiv, 1850.
[5] Untersuch. ü. d. Physiologie des Electrotonus, 1859.
[6] Protoplasma, 1864.
[7] Untersuch. zur Physiol., 1867–68 und Pflüger's Archiv, 1870–71.
[8] Pflüger's Archiv, Band 24, p. 347.

muli to produce a repetition of the effect, a readjustment on a physical basis has been made. A change in the arrangements of the molecules which were at first influenced has been effected. The irritation can be made to induce its first effect, but a *diffusion* of the vibrations into other and more general channels has evidently occurred. A *change of plane* is made, and nothing but a rearrangement of the tissue over which these impulses pass can explain this adaptability of the organism to changes in environment.

Under repeated strains, muscles visibly adapt themselves to new demands by growth. The nerves are no exception to the rule of tissue-increase through exercise, but it would be a narrow view to assign growth of nerves as the only means of adaptability, for demonstrably induration of other parts and diversion of impulses into diffused channels operate toward the same end.

The physical basis of readjustment which enables the miller to sleep undisturbed by the noise of his machinery are of this complex nature; readjustment of many tissues stimulated to simultaneous growth or other change, as the tympanic membrane changes, the tensor tympani relaxation and alteration in blood-vessels. This is more apparent in the artillerist and boiler-maker, whose readjustment entails obtuseness to other and ordinary vibratory influences. The rustic is excited by the confused noises which the city-dweller does not notice, and the latter feels oppressed by too long a continuance of the quietude to which the former is adapted. It is safe to infer that no two nervous organizations are precisely alike, and that ranges of difference exist in the same species, even rendering brains unlike in minute distributions and texture, when they may present the same gross morphological appearances.

This change of plane is exaggerated in tetanus, which, as John Hunter showed, does not require pain as an accom-

paniment. The persistence of unusual irritative vibrations is allied to the tactile interruptions as suggested by Surgeon-Major Ratton.[1] The general molecular changes which normally go on in the nerves are readjusted to this irritative influence, and discordances are inevitable, a slight noise or jar suffices to induce reflexes which were before unexperienced, and this indicates, in common with many other phenomena, that interruptions to the ordinary vibrations afford the basis of reflexes and sensations.

An excellent illustration of my interruption idea is one afforded by respiration, which we do not ordinarily feel or of which we are unconscious. The neural changes are constant, regular, rhythmical, but when a change of plane, such as relative increase or decrease of sensation or motion in other parts, or diffusion, or a shock of any kind interrupts the motions of the heart or lungs, forthwith sensation is evoked, and the change is realized or felt.

Both the telephonic and telegraphic workings afford analogies. The wires are traversed by molecular vibrations which exert no influence over the relay armatures and sensitive diaphragms at the stations, but *interruptions* to the passage of these molecular movements instantly become apparent in the terminal apparatus. Such interruptions may be effected by solution of continuity, increase or decrease of current temperature, or hygrometric variations, etc.

The nervous system, as well as the organism itself, is being perpetually readjusted to its environment, and no sooner is one plane reached than alterations occur which may act as stimuli, but cease to so act. It is only through alterations of adjustment that impressions are possible. These plane alterations are, of course, limited by chemical possibilities related to the integrity of the tissues.

[1] Brain, Jan., 1877.

The following matters bear upon this change of plane:

Muscles which by degeneration have lost their nervous supply are more responsive to the constant current than to induction shocks. Thus the condition of nerves in cases of paralysis may be tested.

Nerves suddenly heated or cooled induce muscular contractions, but not when application is gradual.

Moderate warmth, 45° C., in frog, favors nerve and muscle activity.

Cold at 0° C. diminishes the nerve force from 28 m. to 1 m. per sec.

"Personal equation" shows the varying sensibility of individuals and between them.

Helmholz fixes the rhythmical discharges over motor nerves to contract muscle at 18 to 20 in most animals, and 16 to 18 per sec. in frogs. Löven found these discharges to be 12 to 13 per second in a man's arm.

The law of contractions, analectrotonus, and katalectrotonus are interpretable as increase from low to normal, or from normal to high planes. Ritter's "making and breaking tetanus" shows how convulsions originate in heightened or lowered vital activities.

All show variability of nerve vibrations within a range. "Weber was the first to formulate the law of relation between the stimulus and the resulting sensation. Weber's law is that the increase of stimulus necessary to produce the smallest possible increase of sensation is within certain limits directly proportional to the strength of the stimulus already applied. This law, which is applicable to all the organs of sense, has received a more definite enunciation from Fechner. Regarding sensation as the sum of a series of increments of sensation corresponding to increments of stimulus, Fechner adopted the mathematical operation of integration, and concluded that sensations increase, not in proportion to the strength of the stimulus, but to the logarithm of the strength of the stimulus."[1]

A change of plane changes effect of stimulus. Hyperæsthesia is an exalted plane, anæsthesia a depressed plane.

Adding algebraically stimulation to planes affords good numerical results; thus, let the normal plane equal 1, the hyperæsthetic 2, then a normal stimulus of 1 added to normal plane equals the

[1] Ross: The Diseases of the Nervous System, vol. i., p. 83.

ordinary reflex 2 = hyperæsthetic plane; but 1 + 2 = 3 = pain, which is an accompaniment of all transgressions of usual limits.

Some partially deaf persons hear best amidst great noise.

The law of relativity includes the change of plane consideration. This law, of such universal application, is well discussed by Bain.[1]

He shows that it must be perpetually kept in view, in discussing the emotions, that the measure of a feeling is the measure of a transition.

Pain and pleasure are purely relative.

Change is necessary to feeling.

We are unconscious of unremitted impressions.

The degree of feeling is proportioned to the change.

Abruptness or suddenness of transition is one mode of enhancing the effect.

Most air-breathing animals are insensible of the pleasure of a transition from confined to pure air, as they are not so apt to experience it as man is.

Fishes, in tropical seas, are accustomed to uniformity of warmth. Never to feel cold is never to feel heat. Hence we are unconscious of what is not felt.

Sightless animals have no sense of darkness as we understand it.

Pleasures and pains often depend upon the one preceding the other.

Many pleasures only become such by their cessation.

Any excessive indulgence loses its zest.

Novelty is often pleasurable, and first experiences are most acute, as in puberty, and when travelling, learning, etc.

The longer the remission, the greater the stir or shock of renewal.

After a long privation, a pleasure may regain very nearly its pristine charm.

The perfection of enjoyment in anything is a mean between the repetition that makes the pleasure stale and the privation that leaves an aching void.

The serenity of the man of business under shocks and vicissitudes, opposition, and abuse is in part, though not entirely, due to their frequency.

Case-hardening through familiarity with suffering is inevitable.

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[1] Bain: The Emotions and the Will, p. 57 et seq.

Ennui is the feeling during removal from usual variety of pleasures.

Monotony and painful sensibility succeed exhaustion of organs after stimulation.

Happiness depends upon rotation of familiar pleasures.

Established nerve impulses cease to affect, but interruptions to them are appreciated.

The law of diffusion Darwin amplifies in his Expression of the Emotions in Man and Animals, and Bain regards it as carrying with it the law of relativity.

According as an impression is accompanied with feeling, the aroused currents *diffuse* themselves freely over the brain, leading to the general agitation of the moving organs, as well as affecting the viscera.

The organs prominently affected by diffusion of nerve influence are the members, especially facial features, ears in animals, next the viscera.

Pain may be suppressed by excitement.

The senses are correlated so that one feeling *must* predominate at a time. The eyes, ears, and hands cannot minister to three different feelings at the same time. Frequently a shock of feeling will stop a walk.

No emotion but that it has its outward display, if intense enough.

When feeling is weak, expression is weak.

Education restricts impulses to definite channels. The man no longer sticks out his tongue, as the child does, when he writes.

To recapitulate:

Eminently contractile tissue (muscles) and eminently irritable or mobile tissue (ganglionary gray) underwent differential development and separation. Eminently sensitive organs were subsequently developed from indifferent substances (mainly pigment) in the ectoderm.

These three groups were united internuncially.

All developed from the primitive fibrils arranging themselves in lines of least resistance; such fibrils as conduced most to useful action being perpetuated and developed through use, the remainder of the network remaining un-

developed. In this way, definite nerve tracts arose, grew, and were inherited, undergoing subsequent development and alteration through the operation of the same laws which originally called them into existence.

Nerves undergo mainly quantitative development, *i. e.*, sizes and densities of axis cylinders may differ, but nerve tracts are essentially alike.

End organs differ qualitatively.

Increase of connections is followed by increase of function differentiation; and where commissural union is greatest in brains, intelligence is greatest (Spitzka[1]).

Sizes of axis cylinders and nerve cells are regulated by use.

Time is required in all nerve phenomena.

Nutrition, repair of waste, the assimilation of protagonous material from the blood, as well as oxygen therefrom, is a prime essential to nerve action. Exhaustion for shorter or longer time follows action denoting something consumed, and gray matter is the place where the greatest consumption of material occurs.

The necessity for the absence of much pressure points to a mechanical factor in nerve mobility, as well as a chemical; a certain freedom for molar motion is a requisite.

The increased amount of force put forth by an animal increases nerve size.

The multiplicity of motions increasing increases size of nervous system.

Both quantity and multiplicity of motion increase it to the greatest extent.

Nerve fibrils are in constant motion, molar or molecular, or both, during life, independently of the atomic and molecular motions involved in the disintegration and reintegration of all physiological structures.

Indifferent tissues may and do convey vibrations and,

[1] Architecture and Mechanism of the Human Brain.

when passing centripetally over other than nerves, produce central nerve action, though the cushioning of the cerebro-spinal fluid minimizes this. Nevertheless, extraneous vibrations, such as shocks and jars, are apprehended centrally; any way in which such jars could affect the centres, would become the mode in which such jars are cognized. A fall upon the head inducing flashes of light and tinnitus aurium show, in common with other matters, that molar motions of the coarsest kind can induce the molecular movements of sight and auditory centres. The shiver produced by unpleasant vibrations experienced in riding over badly-equipped railroads, or in some by passing hand over velvet, are other instances of the interruptions to to normal waves sufficient to provoke diffused reflexes being generated by ordinary molar motions. Even the horripilation felt in handling a peach is of a mechanical nature.

All nerves convert their initial impacts into terms of general sensation, as evidenced by homogeneity of nerve structure.

Interruptions to and changes of normal nerve currents constitute stimuli.

Adjustment and readjustment of the nervous system is incessant and causes:

Change of plane of nervous action in varying degrees.

Change of plane changes effects of stimuli.

Fechner's law of stimuli increase is involved in the foregoing considerations as a sub-consideration.

The laws of relativity and diffusion are all important in connection with nervous and mental operations.

These matters being conceded, the impossibility of assigning any special rate of vibration or wave length for normal nerve impulse can be seen. Only the broadest generalizations are admissible, such as warrant the belief that nerve action is more rapid in birds than in mammals,

swifter in the latter than in reptiles, and the interruptions to nerve action would produce quicker reflexes in such animals as possessed the quickest nerve currents. The existence of constant currents is a necessary outcome of the acknowledgment that nerve molecules move at all, and that there are ever present sources of stimulation.

Helmholz assigns twenty-eight m. per second as the rate in frogs, thirty-three m. in man. Foster[1] adopts the latter rate for both sensory and motor activity, believing himself justified in so doing through inability to otherwise reconcile the various discrepancies of investigators. The normal current would vary in health and disease; probably the most accurate figure for the rate could be obtained by using the circulatory as a multiplier. The pulse-wave velocity of between nine and ten m. per second (Weber) could be taken as a factor, though the widely-varying velocity of the blood itself in different channels and its differences of pressure are potent as increments of neural velocities and are results often of such velocities.

Adjustment has taken place with relation to the circulation so that it is seldom felt save in overplus rapidity and in the states which produce tinnitus aurium.

The relative swiftness of pulse and nerve waves stand thus as one to three or thereabouts, often rising and falling together or reacting upon each other.

Helmholz 33 m. per second suffices to base calculations upon in all nerves.

Schmidt[2] measures fibrillæ of neuroglia at $\frac{1}{1000}$ to $\frac{1}{800}$ mm. in diameter, and axis cylinders of adjacent cell processes at from $\frac{1}{3000}$ to $\frac{1}{6000}$ mm.

We have an abundance of observations of nerve materials and their workings in terms of time and length.

[1] Text-Book of Physiology, Reichert's-Foster.

[2] Chicago Journal of Nervous and Mental Diseases, January, 1879.

These terms then are the most convenient for hypothetical deductions. It is of no consequence with what sized axis cylinders a start is made under present aspects of experimentation, for no evidences are adduced of different rates of conduction for different sized fibrillæ, though if the force be in the least analogous to electricity, its conductivity would increase with weight and mass of conductor.

At the seventh annual meeting of the American Electrical Society, December 8th, 1880, I presented a paper entitled "Somatic Physics," from which, as pertinent to this article, the following extracts are made:

The doctrine of energy conservation is applicable to histological studies. The origin of the living cell is no more mysterious than is the isolation of carbon in diamond formation, and inasmuch as in the development of the embryo, the plant from the seed, physical forces are momentarily called into requsition, sound, heat, light, and electricity must be studied more by physiologists if advances are to be made in their science.

Nerves may be regarded as paths of least resistance for the conveyance of forces existing throughout the universe and concerned in the life and act of every individual. The body is a colony of rudimentary forms of life the cellular existence and workings being facilitated by telegraph lines laid down after an orderly plan. Each animal is a republic governed by its own elements, and not a monarchy under slavish subjection to a brain controlled by special laws. The brain, which is nothing more than a multitude of nerve strands and centres, rules the body, but it receives its power to rule from the body.

The physical properties of foods and medicines need scientific scrutiny. Some of the greatest conquests of science remain to be made in the investigation of the laws of light, heat, and electricity in plant and animal life.

Latent and specific heats, the fluorescence of quinine and æsculin, force occlusion and the ability of certain inorganic and organic bodies to yield up their heat, light, or electricity under appropriate conditions, bear relationship to therapeutics and physiology, and promise to make medicine a more exact science.

The following are cited as appropriate points for consideration:

Light contracts the pupil of the eye as surely as electro-magnetism attracts the relay armature.

Sound produces tympanic vibrations and excites muscular contractions.

Heat produces general molecular changes of position throughout the body.

Electricity may produce muscular contraction and its evolution by gymnotus and malapterurus is a neuro-muscular vital phenomenon, though doubtless an aberrant or pathological process which, being found useful to these animals, has been perpetuated.

Phosphorescence is an allied condition under control of the nervous system in some forms, and may similarly be regarded as patho-physiological, doubtless originating in a diseased condition of the nerves and their sheaths.

Gravitation does not lose its control of an atom for having entered into animal or plant composition.

Coffee and sugar are rated electrically as zinc and platinum. Galvanometric deflections may be produced by a voltaic current generated by bitters and sweets, pungents and salts, bitters and acids. Frigorific mixtures, as water at a fixed temperature with salt, alum, acetates, nitrates, sulphur, etc., at the same temperature produce lowering from 3° to 7° Fahrenheit.

It is unaccountable that this rich field for investigation should have been neglected by therapeutists when it so clearly bears directly upon the problems they seek to understand.

Mr. C. H. Wilson, of that Society, then chief electrician of the W. U. Telegraph Co., and I, projected a series of experiments in diathermancy, such as Tyndall essayed. Our intention was to establish the transparency and opacity of many odorous substances for heat rays with a view to *measuring odors*. A relationship can be seen by examining the list as Tyndall gives it. (He, however, did not notice the relationship.) We secured an excellent differential galvanometer, but contemptible "bread and butter" considerations frustrated our scientific zeal. Mr. W. is now at the head of a great telephone company, but often regrets that business should have diverted him from his studies.

When science in the abstract begins to pay in America through governmental or institutional fostering, it will be realized that it is only through lack of means and not of brains that American scientists have been hampered and driven into uncongenial pursuits. Many physical laws used by practical electricians seem applicable to nerve investigation, and some are here given, not to urge the identity of forces, but in the sense of analogy, such as exists between heat, light, and sound, in their reflection from plane and curved surfaces.

Conductivity of wire increases as its weight per foot. Resistance of any iron wire is ascertainable by dividing 360,000 by the square of its diameter, which affords ohms at 60° F.

Resistance is inversely as the cross section, and directly as the length of the conductor.

By analogy long nerves should have thick axis cylinders, other things equal, to atone for the increased resistance of lengthiness.

Intensity is inversely as length, and directly proportioned to conductivity and section.

Two parallel currents of same direction attract one another.

The fusion of the aortic components and other blood-vessels, also the gathering together of nerve strands passing to adjacent parts observable phylogenetically and embryologically, is strikingly related to this Amperian law.

Two currents parallel but running in contrary directions repel each other.

The lesser velocity of electrical impulses over nerves as compared with the greater speed over better conductors, has often been urged as evidence of nerve-force not being electrical, but it is invalid as an argument, for electricity has no proper speed, strictly speaking, over any conductor.

Mr. Wilson, above mentioned, called my attention to the unavoidable formation of *induced currents* in nerves so closely packed as those in the spinal columns if electricity were nerve force. The absence of induction or interference between fascicular workings in that part is the best evidence against nerve and electrical force being identical.

The width of axis cylinders is the only guide we have upon which to base approximate vibratory measurements. In measuring wire conductivity we could not make calculation with cross sections in ascertaining wave lengths, unless the exact point of saturation were ascertained, but in nerve tissue growing with use, adaptation and adjustment to impacts follow, and though amplitude and length of waves are not identical, they are nearly enough so in most cases to admit of diameters representing lengths as well as widths. Strictly speaking, the cylindrical rather than spherical fibrillar structure should be regarded, but as at the best our figures are rude approximations, this is hyper-

critical. Thirty-three m. per sec. with axis cylinder composed of globules .01 to .001 mm. in diameter affords an impact or explosion between globules at the rate of from 33×10^5 to 33×10^6. Let us adopt 10^7 as the usual rate, for convenience of calculation, that is, as the rate common to some nerves under some circumstances. I think the advantages of this assumption will appear as we proceed.

Haycraft,[1] in an essay upon the limitations of time of conscious sensation, states that:

If any sensory surface be stimulated for a given period, a sensation will be produced which will not exactly correspond with this stimulation in point of time.

The sensation will be produced a certain interval after the first movement of application of the stimulus. It follows from this that two stimuli following one another sufficiently rapidly will give rise to a single sensation. The correspondence in time between the stimulus and sensation varies in the case of the different senses.

Tactile impressions applied slowly (one to forty per second) give rise to distinct and separate feeling. More rapid stimuli are fused and a feeling or sensation of "roughness" is produced.

If the impacts follow faster than one thousand and four hundred per second, the sense of "roughness" disappears and a sensation of single impact is produced. Tickling is produced whether an impact stimulates a number of sensory areas one after the other, as in drawing a feather over the skin, or if impacts follow one another on the same sensory area; for impacts of fifty to one thousand and four hundred per second, if applied to the same sensory area, produce "roughness" if forcible enough, but when lightly applied they produce "tickling."

Different areas of the skin vary in sensibility. Sensations of heat and cold vary in times of appreciation. Haycraft holds that the differences in the exact limits of the feelings seen in the different sensations are not due to any difference in the centrally produced feelings, but to the differences seen in the translation of the external energy into nerve energy through the end organs.

In the sensations of sound and light, as well as in the tactile sensibility, when stimuli are repeated more and more rapidly, a period preceding complete fusion is reached when the sensation

[1] Brain, April, 1884, p. 141.

produced is disagreeable in its nature. In the case of sound the irritation is produced by beats; the cause of "dissonance" in music is due to recurring stimuli not to be separated in consciousness, and yet not rapid enough to give rise to a simple sensation of sound.

The flickering of a flame is irritating in its nature, and tickling in the case of tactile sensibility may give rise to excruciating agony. We may compare therefore roughness or tickling, tactile sensations, to dissonance in music. Bloch[1] finds tactile sensibility from finger of hand took $\frac{1}{31}$ second longer than by auditory apparatus. Vision is most rapid, next sound which is $\frac{1}{71}$ second longer than visual transmission, and tactile sensation is $\frac{1}{31}$ second longer in transmissions than vision.

If nerves conveyed physical forces *per se*, there would be no use of end organs. It is in these peripherally located organs that translation of impacts occurs into terms of interruptions of previously existent vibrations.

Stimuli added to the ever present stimuli which induces the normal can but change the rate of speed, but when once changed and persisting, it becomes a change of plane and ceases to be a sensation. It is, therefore, the rise and fall of rapidity which is appreciated, and the rapidity of this rise and fall is the thing appreciated, for slowly induced changes we know are unfelt.

We cannot multiply the number of vibrations causing the sensation into the pre-existent waves, for the reason that the new effects of stimulation, if prolonged, become blended with the previous normal. An acceleration of the normal must be granted as an effect of all stimulation, but continued stimulation ceases to accelerate, and a plane near the former normal is reached in longer or shorter time. Thus the "palling" or cloying of senses occurs.

Sensation, so far as movements among the nerve elements is concerned, is accompanied by two conditions, the temporary acceleration of the normal, and intervals between impacts of acceleration. The latter can be likened to

[1] Gazette des hôpitaux, No. 128, 1883.

the swing of a planet within its orbit, after the perturbing attraction ceases to draw it outward, and nerve normal can by exhaustion drop below its usual plane, so far as to, through relativity, cause the sense of an interval between impacts.

Conceive 10^7 the nerve normal. A single impact in a second raises this to 2×10^7. The instant of contact, the acceleration and the cessation or drop to normal, which may not be simultaneous with duration of impact, constitute the impression. The problem would be simpler if simultaneity existed, but as the duration of an impression outlives the impact, it must be duly considered.

Tactile fusion occurs with fifty and with one thousand and four hundred impacts per second.

Ocular sensations, repeated ten times a second, fuse.

One hundred and thirty-two dissonant "beats" of tuning forks fuse.

Forty auditory vibrations per second last $\frac{1}{11}$ second, forty thousand last $\frac{1}{5000}$ second.

Residual optic sensation for light of moderate intensity is $\frac{1}{24}$ second. Red, violet, and green last in the order named.

The interval between optic stimuli varies according to the light intensity, being shorter with stronger light. Faint light has an interval of about $\frac{1}{10}$ second, strong light $\frac{1}{30}$ second to $\frac{1}{50}$ second. Though the sensation is longer with the stronger light, the decline begins earlier, and successive sensations of bright light are fused with greater difficulty. The interval at which fusion occurs is shortest with yellow, intermediate with red, and longest with blue.

The duration of a stimulus necessary to affect the retina is exceedingly short, as when the electric spark causes sensation of light.

The smallest difference of light which we can appreciate is about $\frac{1}{100}$ of the total luminosity used. The same law holds good with the other senses. The smallest difference we can detect in length between two lines is the same fraction of feet or inches, in lines feet or inches in length. Weber's law is that appreciation of stimulus increase varies in proportion to the whole stimulus, and it fails where the stimulus is very small or very great. Fechner's law is that "the sensation varies as the logarithm of the stimulus."

According to the obtuseness or extreme sensitiveness of the end organ, so will the duration of the impression be shorter or longer.

For the same organ slow vibrations are felt longer than quick vibrations.

For the same organ intensity of impression lengthens the duration. But the rapidity of conduction is a different matter. This has been worked out though Exner's "reaction periods," but we cannot use the tables, for the time of conversion of impressions into nerve waves and motor effects are not separated. To determine differences between senses it might answer, but not between muscle and nerve action.

The fact, however, that this reaction is accelerated in hyperæsthesia, and retarded in anæsthesia, bears upon the change of plane theory.

There is obviously less resistance to the tactile movements in nerves admitting full appreciation of forty impacts per second as separate sensations, and imperfect appreciation of these to one thousand and four hundred per second as "roughness," than in the optic nerve movements which fuse impressions of ten per second.

The question may well be asked, Is this due to continuous peripheral action or to the central duration of the impression? "Dilemma" times and durations measured on nerves separated from terminals suffice to show it to be largely non-peripheral, though there is a mixture not eliminated.

In an endeavor to trace the evolutionary aspects of the different senses, it is to be remembered, that the tactile sense itself has undergone development, and that the primitive sensibility is far more obtuse. The greater duration of an impression is in some respects a measure of its higher development.

Though both tactile and auditory are closely related, the

manner in which the receptive organs are impressed in both cases differ. The cuticle is directly touched with a comparatively hard substance in one instance, and in the other an elastic medium, the air, conveys its pulsations to the tympanum, and modifications of these waves are undergone before the auditory nerve is affected.

Mayer's researches on the male mosquito antennæ prove in that case that the aërial pulses affect the fibrils at right angles to the antennæ; the latter conveys the resulting waves inward, but there is a multiplicity of arrangements for effecting auditory appreciation between different invertebrates. The vertebrate auditory apparatus has a decidedly mechanical structure.

The ability to distinguish separate impacts in time is one thing, and the ability to distinguish series of vibrations apart from each other is another. The first is of a molar nature or moleculo-molar, the second is molecular and consists of chemical disruptions comparable to the explosion of the nitrite when the musical note to which it is susceptible tears its molecules apart.

Helmholz[1] says: "As the difficulty of making a trill in the bass is the same in all musical instruments, the vibrations of the mobile parts of the ear for bass are not damped enough to prevent two sounds succeeding each other so rapidly without blending. There, hence, must be in the ear different parts which are set in vibration by sounds of different heights, and which give the sensations of these sounds.

For 40 vibrations per second, a residual sensation lasting $\frac{1}{11}$ sec. For 40,000 vibrations per second, a residual sensation lasting $\frac{1}{3\,0\,0}$ sec. Thus the residual sensation of 30 vibrations per sec. should last $\frac{1}{10}$ sec., for they follow at $\frac{1}{30}$ sec. intervals. Why do they blend?

Do not these distinct impulses fall on the ear in $\frac{1}{10}$ sec.? Co-vibrating bodies in the ear tuned to vibrations below 40 per second do not exist. The ear vibrates *en masse*, and the duration of these oscillations of the ear as a whole are far too short to remain the $\frac{1}{30}$ sec.

[1] Tonempfindungen, p. 215.

Some of the agencies to produce vibratile motion are comparatively coarse, such as otoliths, while the tactile corpuscles receive their impacts direct, and their wave interruptions appear to be of a simpler nature; the auditory apparatus is elaborated to converge the diffused sound waves, and convert them into vibratile motions of lesser terms. The lower series of notes act as tactile impressions to the ear and induce moleculo-molar changes, the higher up to 40,000 (the range being only to 16,000 in most persons) waves per second produce such neural motions as are closely allied to the 1,400 per second "roughness" discrimination of the tactile sense wherein the molar motion is a minor product and the molecular the major one.

The moleculo-molar rapidly fades into the molecular as 40,000 is approached in hearing and 1,400 in feeling. The disagreeable feeling Haycraft notes as preceding fusion is the dissonance of erratic nerve action. The capacity of the nerve for certain rates of waves is transcended, and correlatively painful mental feelings occur during doubting or constraint. Higher than 40,000 auditory waves are not appreciated, because there is no end organ in man rendering him susceptible to them.

Sir John Lubbock has demonstrated the ability of "lower" animals to be affected by vibrations ultra spectral and ultra acoustic.

The opacity of nerve substance precludes the possibility of light vibrations passing to the cortex. Heat appreciation must be translated into lower terms, for high heat molecular movements are disintegrative. We are forced to the conclusion that neural vibrations are normally higher than sound, over 40,000, and much lower than heat vibrations of the ultra red ray.

The disintegration of the visual purple, causing interruptions of optic wave-lengths, seems the most rational

explanation of sight. Rhodopsin absorbs all rays, and it is fair to presume that upon its disintegrative times will depend the color of the light perceived.

Gamgee[1] dwells upon the bleaching phenomena, and cites many facts which could be usefully considered in elaboration of a chemical interference theory. We have room for a few only.

The order of bleaching is yellowish-green, green, blue, greenish-yellow, yellow, violet, orange, red.

According to Boll, light perpetually destroys the retinal color, and darkness regenerates it. Thus in the space of a wink regeneration occurs, and light acting upon many points, affords time for regeneration of points acted upon. Mayer[2] appropriately remarks: "May not research in this direction be guided by the hypothesis that the molecular constitution of the retinal rods and cones is such that their molecules are severally tuned to vibrations corresponding to the red, green, and violet? This would lead us to look for effects of actinism on the retina, as showing the link existing between the transmitting and sensory functions of the eye. Do not the facts of the known persistence of chemical action, after it has once been initiated, and the time which would be required for the retinal molecules to re-combine or re-arrange themselves after the ethereal vibrations had ceased, comport with the known durations of the residual visual sensations, and with the main facts of physiological optics, better than the hypothesis that masses of the retinal elements are set in vibration, rather than their molecules?"

Actinism is often erroneously used in the sense of being the only chemical force. Many forces produce chemical effects, such as sound, heat, electricity, as well as light, but actinism is the light chemical force, and abounds in the violet ray and beyond, though inherent in all rays. The molecular force mentioned herein as constituting the electrical is of lesser wave length than any light ray. White light appears to me to be the resultant of all rays through destructive impacts, while purple absorbs all rays. This explains the matter discussed by Sidney Hodges. The

[1] Physiological Chemistry of the Animal Body, p. 465.

[2] Researches in Acoustics, Am. Journ. Arts and Sci., 1874, p. 251.

[3] On Some Peculiarities connected with Retinal Images. Brain, April, 1884, p. 77.

law of relativity causes the eye to accept as white light any light prevailing if intense enough. So the nervous system growing habituated to myriad impulses, accepts these as the normal ones, and variations from the plane adopted become the excitants. Many noises to which the ear grows accustomed constitute an analogous datum plane for audition, which must be transcended in amplitude or wave-length to stimulate the acoustic apparatus.

Color perception is a differentiation of simple perception of light and shade, such as we have reason to think constituted the rudimentary light perception. The subsequently acquired media of the eye act as does water in cutting off the heat rays, otherwise heat would be seen. A pigment which responded indifferently well to light gave place to the visual purple with definite actinic attributes. From the great rapidity of all light, there must be an intensification of pre-existing nerve vibrations. In the dark, the normal vibrations occur over the optic nerve, but a little light suffices to start the molecules to more rapid interchanges of position. Periods of vibrations, or times, constitute pitch in music and hue in color. The amplitudes decide the intensities of sound and the brightness of light. Hence, in dealing with stimuli, the height as well as length of a wave must be measured.

The rapidity with which rhodopsin changes, varying in different individuals, culminates in extreme variability in color-blindness, and the acuteness of color perception which accompanies or precedes some forms of insanity. Sight is dependent upon visual purple interference or absorption of rays. Where the pigment fails to bleach, or changes too rapidly or too slowly, color aberration would be inevitable.

M. Morren,[1] referring to Tyndall's Kinetic Energy of Vapors

[1] Comptes Rendus, Aug. 9th, 1869.

in Light, says: "If a body forms and maintains itself in certain undulatory conditions, it is necessary that the oscillations of the atoms which constitute its molecule should be different from those of the medium where the body is produced. But if the body is transplanted into another medium, where vibrations synchronous with those of its atoms are produced, the vibrations of these last become more energetic, and the live force which they accumulate thus becoming considerable, the atoms are thrown to a distance from each other greater than the radius of their sphere of action. The atomic edifice, previously formed, is demolished, the atoms preserving their special attractions for a new edifice, possible in the conditions of oscillation which surround them, consequently not possessing longer the same synchronous oscillation as those of the medium."

Thus, with the free light waves saturating rhodopsin with wave lengths .0007 mm. long, at the rate of 392×10^{12}, for red light, and .0004 mm. long, with a rapidity of 757×10^{12}, for violet light, retardation of these times and elongation of the waves takes place, raising our hypothetical nerve current from 10^7 to x, y, $z \times 10^7$. The multipliers can readily take the place of the three nerves of the Young-Helmholz theory of red, green, and violet light, and intermediate rates would account for the other colors, the x, y, z being molecular modes possible to the optic tract and synchronous movements of any two or all constituting the composite color sensation.

The increased rapidity of nerve action, with increments of heat, about 1 m. for 3° C., is an expression of the physicist's observation that the "kick" of a molecule depends upon its increase in temperature.

Lockyer compares the motions of sound and light to the orderly movements of a company of soldiers, and likens the molecular motions induced by heat to the irregular movements of a crowd. This simile may be carried into neural vibrations, those induced by electricity, light, sound, or tactile impression being orderly and definite, while heat tends to add to the instability of the molecule,

and where it induces movements, they are of an irregular nature; but these very irregularities constitute their mode of impressing themselves upon the consciousness.

Olfaction apparently depends upon an irregular molecular motion of particles impinging upon the Schneiderian membrane distribution, odorous substances having regular orbital rotations constant for each substance, aerial interferences making their conveyance to the nostril irregular.

Gustatory sense, when separated from olfactory and tactile accompaniments, evidently stimulates the taste buds through solution and chemical disruption, rotations, and impacts. Above and below 40° C., taste is impaired, showing the circumscribed nature of this differentiated tactile sense.

	Normal.	Rise by stimulation.	Produced by
Sensibility or Feeling	$= 10^7 \times a$	+	Neural vibrations.
Touch	$= 10^7 \times b$	+	Steady pressure to 50 and 1,400 impacts per second.
Taste	$= 10^7 \times c$	+	Moleculo-molar solution impacts.
Smell	$= 10^7 \times d$	+	Molecular rotations.
Hearing	$= 10^7 \times e$	+	40 to 40,000 aerial pul sations per second.
Sight	$= 10^7 \times f$	+	Rhodopsin bleaching by atomic vibrations 392×10^{12} to 757×10^{12} per second.
Heat	$= 10^7 \times g$	+	Irregular vibrations with amplitudes and lengths increasing 1 m. per 3° C. per second.

The law of diffusion may assist in seeking the values of a to g.

Some effects of diffusion upon nerves are secondary such as those resulting from the heart palpitations, tremblings, flushings, etc.; but primarily diffusion may increase or decrease general sensibility, tactile in production of formications, gustatory sense in producing taste impressions (occasionally during fright, anger, or electrical stimulations of other nerves, showing close relationship of taste and tactile), vaso-motor and motor disturbances. Sometimes tinnitus is induced, but this may be secondary from vascular changes. Audition, olfaction, and sight are in health generally beyond the range of diffusion of nerve excitement.

For working purposes, arbitrary values of a to f may be taken as ranging from 2 to 7. Heat having an altogether different motion from the other forces, g would have a hyperneurotic general value to be considered apart.

Thus the higher molecular energies, as electricity, light, heat, and the moleculo-molar energy, sound, may stimulate sensations of each other in a descending series, and produce tactile and motor phenomena, but, as a rule, the lower rate of vibrations cannot produce the higher, except in abnormal conditions of the nerves when hallucinations of the higher senses are possible.

This explains why paræsthesiæ are so common as to pass almost unnoticed, but aberrations of the higher senses denote profounder disease.

The loss of taste and smell are the most common affections of special sense associated with anæsthesia; loss of hearing is less frequent, and loss of sight is rare. In hemianæsthesia, taste and smell are usually abolished on one side, but hearing and vision are only diminished.[1]

When a locomotory organ arose in metazoon existence, there was a concomitant necessity for a definite amount of nerve vibrations to pass to that organ; otherwise, it would

[1] Ross, The Diseases of the Nervous System, p. 99.

either not act or would react to all stimuli. Thus a subsequently acquired organ must have another amount of impulse over its nerves. These rates must be relative to the plane of whole neural activity. Effort means increase of molecular activity, and as weighty organs require more muscular effort, so there cannot fail to be established differences between *amounts* of neural vibrations sent to parts requiring to be moved.

In telegraphic engineering, the *amount* of current evolved is termed its quantity which may be increased or diminished by lessening or increasing the resistance in circuit both in the generator and on the line. The quantity of electricity which in any unit of time flows through a circuit is called the *intensity* of the current.

This intensity is equal in all parts of the circuit, no matter how heterogeneous the parts are, and it is proportional to the electromotive force.

Resistance is inversely proportional to the intensity of the current. From this, Ohm deduced his celebrated law: "The intensity of the current is equal to the electro-motive force divided by the resistance," which is expressed in the formula: $I=\frac{E}{R}$ where I = intensity, E = electromotive force, and R = the resistance.

Many telegraphic laws are applicable to the nervous system. We derive four considerations: intensity, quantity, resistance, and energy (molecular). The differences between quantity and intensity may be apprehended by comparing the relative energies of two rivers flowing five miles an hour, one having a width of a mile, and the other of a few feet. The intensity of both is the same, but the quantity of the wider is the greater. Lessen the current rapidity in the first instance to a few feet per hour and increase the rapidity of current in the small stream to fifty miles per hour, and the intensity of the smaller stream exceeds that of the larger, while quantities may remain alike.

Haskins[1] defines electro-motive force as the power

[1] The Galvanometer and Its Uses, p. 8.

which a cell or battery possesses of causing a transfer of its current from one place to another. For our purposes this may be termed energy. It is to a current what pressure is to steam.

This energy or pressure when impeded or resisted lessens the quantity of the current. $Q = \frac{E}{R}$ may be substituted.

The quantity of current over a nerve may, from this analogy, be regulated by the resistance of the nerve.

Greater muscular action calling for greater neural energy (Mercier claims muscle and nerve expenditure proportioned to one another in the same act), the larger the sum of the combined cross sections of the axis cylinders, the greater will be the quantity, the less will be the resistance, and as $Q = \frac{E}{R}$ *the lessened resistance of the larger axis cylinder admits of a greater quantity of molecular movement for the same energy or pressure* (*rapidity of vibration*) *than when the axis cylinder is small.*

The relative total current force may rise and fall with change of plane, but, *cæteris paribus*, the relatively larger-sized motor nerve of the same level offers a better avenue for quantity than the sensory nerve. The tensions of differently sized wires may be paralleled by differently sized nerves in apposition. With the greater resistance of the smaller-sized sensory nerve, the tension would be great, and the current would be extremely easy thence to the larger motor fibres.

When the sum of the centrally produced vibrations are sufficient in energy or pressure to overcome the resistance of a motor nerve and furnish quantity enough, the precedent motion, characteristic of the muscle irritated, is produced in that nerve.

Resistances vary as cross sections and numbers of nerves, hence different motor nerves require different quantities of molecular energy.

According to Gerlach,[1] and as can be seen by direct inspection, the more the motor function of a fibril becomes evident, the larger is it relatively to associated evidently sensory fibrils in the same tracts or areas. Though many motor are smaller than many sensory, and great ranges of sizes exist between fibres of similar function, associated action, I think I am safe in predicting, will be found to entail relatively larger fibrillar cross section upon motor function.

Sensory fibres and cells are relatively smaller than motor fibres and cells when associated physiologically with one another.

As before mentioned, *use* determines the size of nerve and cell, hence the large cells of Purkinje in the cerebellum and the great size of those in the auditory nuclei, though related to sensory function, must be taken in connection with the network of finest fibrils in the internal auditory nuclei which Meynert mentions as "of all the masses of the gray floor the most closely interwoven with fine fasciculi."

Henle[2] mentions an average of fifteen mmm. for motor and ten mmm. for sensory diameters, but calls attention to the relativity of these measurements, the larger fibrils reducing to smaller in their terminations. Efference is quantitatively greater than afference, and, as Spencer notes, the centrifugal waves are the stronger.

When the requisite quantity of energy is produced in the central area through afferent irritation, the reflex motor act follows.

The differences of stimuli rates required to contract red and pale striated muscles tetanically are ten in the former to twenty to thirty in the latter per second, and indicate probably better facilities for quantitative conduction in

[1] The Spinal Cord, Stricker's Histology.

[2] Handbuch der Systematischen Anatomie, Nervenlehre.

the case of red muscles, though the rates of the contraction of muscles being quicker in insects than in frogs, and in heart muscle than in intestinal smooth muscles, bear upon differences inherent in the muscles themselves. Sympathetic fibre resistance, however, is relatively greater than in other nerves, owing to the relatively smaller-sized fibres that system contains. The 19½ muscle beats of Helmholz denotes the meeting of quantity impulses needed to convulse a muscle.

Francke and Pitres[1] deduce from their experiments that motor excitations transmitted through the cord pass only 10 metres per second. Helmholz and Baxt say that cooling a motor nerve caused the speed of transmission to fall from 33 to 30 m., and when heated accelerated it 89.4 m. According to Foster, sensory impulses vary from 26 m. to 44 m. or more a second. He concludes that sensory impulses do not differ in speed from motor essentially.

As between sensory and motor speeds, I incline to think that relativity here comes in with resistance and energy, proportioning the speed regardless of mere name of the nerve.

The diffusion caused by fright causing the knees to knock, extreme weakness, and the fact that over-exercise of one set of nerves occasions weakening of the general nervous system, shows the dependence of the entire system upon the relativity of its motions, and that special abstraction of energy, either in intensity or quantity, entails general abstraction of nerve force.

To account for the great number of nerve fibrils, we must restrict the wave lengths to sets of nerves especially adapted to certain wave lengths, or consider that nerves differ in susceptibility to different intensities or quantities of molecular motion. One wire suffices in telephony and telegraphy to pass countless millions of vibrations of different lengths and amplitudes.

[1] Gazette des Hôpitaux, Dec., 1877.

By analogy I would prefer the view that *all nerves convey all ranges of wave lengths common to any nerve, but the cross section determines the quantities of motion they were capable of conveying.*

Simple reflexes occur when the accumulated centric vibrations are generated in quantity sufficient to saturate the motor nerve or reach the point requisite to induce the production of the requisite quantity.

Compound reflexes are produced through the quantity sufficing to supply or propagate force in another nerve.

The alternate exertion of bilateral groups of muscles consists of the easier transfer of irritations from the exhausted side to the nerve roots of the rested side.

The walking of vertebrates generally, and the swimming of the fish through alternate exercise of muscles on both sides are instances.

Compound reflexes are only coördinated through much training, and involve not only the building up of the necessary correlating fibres, but the regulation of their sizes to the demands made upon them.

In what does inhibition consist? We know that in spite of stimulation, a muscle may resist action. A channel for diffusion seems to be afforded, but two opposing currents acting simultaneously, nullify the effects of both. When two contrary impulses are generated, the resultant is zero. In a checked impulse to go forwards, for example, the impulse necessary to do so is too feeble, the generated waves are not sufficient, but in doubt whether to turn to the right or left, both groups of motions are alternately feebly excited, but strongly enough to swerve the body in both directions, but other channels are also operated upon, diverting the currents. In complex phenomena such as these we are apt to lose sight of the simple conditions upon which they depend. One reflex being possible, another is also possible, the correlation of these two reflexes succeeds

by division of currents between them and the possible number of compound coördinate reflexes which may follow are incalculable.

Putting this into nerve-force terms, we have: general sensibility 10^7 to $10^7 \times 2$ sufficing to saturate a motor nerve, the cross section of which admits of $10^7 \times 1\frac{1}{2}$ as its quantity, the simple reflex results. The remainder of the stimulus being diffused in adjacent gray substance, but if added to by a subsequent reverberation of $10^7 \times 2 = 10^7 \times 2\frac{1}{2}$, then a more distant organ in addition may be stimulated, their synchronous action requiring the generation of a higher molecular action or the successive discharges from centre to both channels. These motions are only practicable when the nervous system has undergone adaptation, adjustment to the conditions necessary to provoke them.

A protozoon which adapts itself to a change in environment can only do so through environment reacting upon its molecular structure and making such rearrangement of its sarcodal elements as will render further life possible to it, just as continued abrasion and impacts on palms of hands and soles of feet harden the dermis mechanically so that inconvenience from labor or much walking is not experienced as formerly, so in nerve and muscle tissue the physical basis of "becoming accustomed" to anything is in a mechanical or molecular rearrangement of one or both of these organs. Certainly the ability to lift heavy and heavier loads is accompanied by and dependent upon the growth of muscles and inferentially nerves.

Reflexes consist of stimuli evoking waves in such speeds, lengths, and quantities as comport best with molecular motor movements sufficient to excite muscles. The cord reacts best between nerve elements of the same level. For reflexes of different levels the stimulus must be increased or be produced by summation of other molecular movements to the intensity and quantity that

will do the work. When things are done instinctively, it is by virtue of the readjustment which makes the reflex easy. Habit, instinct, adapt means to ends so effectually in proportioning widths of axis cylinders to lengths, and the whole resistance is lowered to the point which makes reaction to constantly recurring certain stimuli so exact and inevitable as to make deviation from acquired facility of muscular motion extremely difficult, compelling the painter to use his left hand occasionally, to overcome the precision of touch which constitutes his "style."

With regard to "trophic nerves," the general belief is gaining ground that none such exist, but that nutritive changes which follow nervous lesions are referable to vascular disturbances. This is so satisfactory that it at once transfers the mysterious and inscrutable to simple and knowable processes. Trophic influences are placed within vaso-motor precincts.

Lawaschew,[1] of St. Petersburg, under Professor Botkin, elaborates the subject, and holds that dilatation of vessels consequent on nerve lesions are often precursors of "trophic changes" in the tissues and due to "irritation of the vaso-dilator nerves," and not to paralysis of the vaso-motors.

The foremost vaso-motor stimulant is temperature difference, but other modes of molecular motion influence that system either directly or indirectly.

The vascular function is a highly nutritive one, and where first one part of the body and then another demanded blood supply in excess of other parts, just such slow rhythmic pulsatile motions as are observed in the vascular system would follow engorgement and dilatation of one part would passively effect distention of distant parts subjected to regurgitant pressure, a to-and-fro irritation of the arterial circular muscles would arrange commissural tracts facilitating transfer of equilibration and maintenance of

[1] Centralblatt für d. Med. Wis., 1883, p. 193.

tonus. Dilatation of one part stimulating molecular diffusion from other parts to act as constrictors, the calibres of the vessels are kept within limits.

An equilibrating electrical pumping apparatus could be constructed upon this principle. Around a flexible tube pass segments of electro-magnetic clamps, so arranged that when one set of clamps are pressed apart by over distention of a part of the tube, it "short circuits" the current passing over a wire which extends the length of the tube, and causes the distributed current to act energetically in the part needing constriction, entailing an expenditure of force which drops the general normal several galvanometric degrees.

Distention acts as a generator of force (the increased heat and other molecular interchange is evident in distended parts), this suffices to raise the nerve vibrations in that part, and with increased blood consumption the facilities for both muscle and nerve motion are locally increased, but the diffused motions pass to the general sympathetic system which, having its plane of action and exerting its usual tonicity force elsewhere, distributes the pressure. It is evident that this can be effected but slowly, the mechanism for quick equilibration between all parts not existing, but as Carpenter[1] says: "When once a mode of nutrition has been fully established it tends to perpetuate itself," and, he might have added, differentiate and develop. Between points remote or contiguous wherein fluctuations are extreme, there would arise better facilities for equalization through simple development by extra use of the fundamental system.

Antipodal head and abdomen, with their complementary alternate excess and diminution of blood, have built up the splanchnic and cervical with the spinal sympathetic commissures. With dilatation of one pole a channel afford-

[1] Human Physiology, p. 556.

ing least resistant passage for a constricting influence would be a desideratum, and forces acting on that line would build it up. Granting the constrictor abilities of the splanchnic and cervical, how shall we account for the dilatation through stimulation of nervi erigentes, chorda tympani, and muscular nerves?

Dilatation is a nutrient reflex. Upon muscular excitation there is a reparative demand. If a muscle be stimulated to contraction, it would seem proper that means of repairing the waste involved in the contraction should be provided. The osmotic power of the vessels is drawn upon with muscular action, occasioning a secondarily induced rush of blood to the part being nourished. This being the established action of the entire nerve distribution in the parts under consideration, that mode of action would adjust both cerebro-spinal and vaso-motor systems to its repetitions, and it must be borne in mind that vaso-dilator fibres run chiefly in the cerebro-spinal, vaso constrictor in the sympathetic nerves, but even admitting the dictum of Dastre and Morat,[1] that vaso-dilator fibres exist in the vago-sympathetic trunk, concomitant phenomena, such as dilatation following exercise of a part, could develop the molecular susceptibilities of a nerve constantly associated with definite workings of other nerves as to render the dilatation constant, whether the motor or the sympathetic branch were irritated.

Associated serviceable habit develops the most extraordinary capabilities throughout organic life, especially evident in the emotions, as Darwin has shown so well.

Bernstein[2] concludes that "carbonic acid dyspnœa" is chiefly expiratory in character; the dyspnœa caused by want of oxygen is chiefly inspiratory. These relative influences upon the respiratory

[1] Arch. d. Physiol. Norm. et Path., 1882, 1, 2, and 3; and Centralblatt f. d. Med. Wiss., 1882, p. 731.

[2] Du Bois-Reymond's Archiv, 1882, p. 313.

centre of excess of CO_2 and want of oxygen in the blood can only be demonstrated by cutting off the vagus control.

Blood condition in a centre can become associated with distant movements, calculated to alter the nutrition of the irritated point for the better, and whether through paralysis of a strand or through stimulation, the adjustment of the nerve to its function may result in diametrically opposite modes of working. The apparently erratic conversion of constrictors into dilators and *vice versa* are best accounted for by Lepine's[1] experiments on the frog's sciatic, the conclusion from which is that the same fibre may act as dilator or constrictor, *according to the condition of the peripheral mechanism.* Foster[2] suggests that the paths along which the impulses of afferent or central origin issue as efferent impulses are determined in part by the condition of the cord and character of the afferent impulses, or of the central disturbance.

The vaso-motor phenomena attending *every* reflex, whether cerebro-spinal or sympathetic, are of more importance than could be judged from their little consideration by writers. The assumption of a vaso-motor accompaniment to every act of the nervous system involves an explanation of much hitherto considered inexplicable. No blood, no action; plus blood, plus action. Every vital act incurs expenditure, sensation as well as motion. The irritation of every cell causes waste, and necessitates repair. If the reparative (vaso-motor) power be annulled, the function ceases with death of the part. Regeneration of nerve areas must be regarded as identical with that of any other tissue. The brain is nourished precisely as are other organs, reflexly through irritation at the point needing restoration. Molecular change, depletion, expenditure is the irritant. The amœba moves more rapidly when

[1] Comp. Rend. Soc Biol., March 4th, 1876.

[2] Physiology, p. 284.

hungry than after being fed. The vaso-motor is the reparative system, and its reflexes must be considered with reference to that function, regardless of but little else. Such visceral parts as use blood most rapidly are in the greatest condition of vaso-motor irritation. Habit fixes the quantity of blood and regulates its afflux. The vaso-motor connections with the cerebro-spinal system have the same significance as their connection with other organs. Splenetic, gastric, uterine, hepatic, etc., irritation, through want of blood, starts the reflux, and no matter whether sensory or motor nerve needs restoration, the irritation of either will start vaso-motor action as readily as to abdominal viscera.

The connection of sympathetic fibres with both sensory and motor cerebro-spinal nerves has no other value than that the vaso-motor system recks of molecular motion without discrimination as to whether those motions produce sensations or muscular actions. If a sensation pass over a spinal nerve, molecular motions are set up in that nerve and stimulate vaso-motor action; if a motor nerve be engaged, both nerve and muscle thereby excite vaso-motor afflux of blood to them. But due regard must be paid to the blood conveyance in the entire animal, for a disturbance at a distance may render stimulation of other parts inoperative. Hence the variable nature of sympathetic workings may be represented by the active points ABCDE, having a tonus of 10 along their vaso-motor filaments. A, being stimulated to contractile effect 20, BCD E vessels at first are dilated by blood pressure, but by diffusion the general tonus is distributed as 12 to all points. Let E demand repair through exhaustion, lowering the tonus of E to zero, then the remaining tonus of all falls to 9.6. Now let C and E require blood before the vessels at E have been restored to their usual calibre, ABD will be in tone, C dilated, and E extremely dilated. It is plain

that a strand ordinarily acting as a constrictor at A, could not thus act at this stage, but would appear to act as a dilator through its stimulation having aided in raising the tone of C and E, the general distribution causing the tone at A to fall.

The vascular tonus being normal generally in the "indifferent regions," there will follow dilatation if other vascular regions are dilated, through diffusion acting first to re-establish tonus, the dilatation being compensatory in the region apparently stimulated.

Vaso-constriction is the usual effect of vaso-motor irritation. Vaso-dilatation may become the normal effect of stimulation of a vaso-motor nerve by associated influence of cerebro-spinal nerves, or by diffusion of vaso-constriction to adjacent vascular regions with minus tonus, such minus tonus may be the effect of the same stimulation which produces the apparent dilatation, through action stimulated in those adjacent parts (muscular, usually), or the minus tonus may be caused by synchronously operative distant causes. Habit, adaptation, or readjustment will thus implant dilating instead of constricting function upon certain vaso-motor regions. In the simplest possible language, if other accessible parts need constriction or restoration of tonus most, diffusion in lines of least resistance will occur, and the apparent dilatation of the near point is the afflux of equilibration. A part having this mode of action established would develop facilities for diffusion of stimulation to the other parts, and by relativity of forces the near part would be paralyzed, and dilatation become extreme in that part on stimulation.

Thus far, I have purposely avoided any mention of nerve cells or ganglia participating in nervous or mental workings. When I affirm that there are many and good reasons for regarding the main function of the nerve-cell to be *histogenesis*, and that all the workings of nerves

proper, and the sensitive basis substance, such as the neuroglia of the spinal cord and brain cortex, are best or equally as well studied without reference to the nerve cells, I state that which needs defence, but the acceptance or rejection of the histogenetic function view and the refusal to concur in or adherence to the olden view of the nerve cell being an energy-producing body does not affect in the least the value of the deductions or inferences up to this point nor those to follow. *There is no dependence of the inferences mentioned upon the correctness or incorrectness of my theory that the nerve cell is a cell, correctly so named, with highly reproductive powers, and very small and few other powers.*

In saying that this assertion needs defence, it must be remembered that the olden theory of force-production function on the part of the nerve cell needs equal defence, and is an assumption of the broadest kind, to sustain which the most trivial reasons have been offered in the face of much evidence to sustain a contrary view.

March 11th, 1881, I advanced my histogenetic nerve-cell theory in a paper read before the Illinois State Microscopical Society,[1] and made it the subject of my American Neurological Association thesis at its June, 1881, meeting. The grounds for my conclusions are as follows:

The nerve-fibre and not the nerve-cell is the first to arise in forms above the protozoa, as in Kleinenberg's Hydra, Pseudonematon, and other low worms. In noto-chordal animals such as the amphioxus *an elaborate system of nerves exists without a nerve-cell being present.*

Free nuclei and neuroglia abound, such as Schmidt[2] and others[3] observed in the human embryonal nervous system, where nerve-fibrillæ cluster about nuclei, the fibrillæ arranging themselves in rows and fasciculi. "The pia mater extends from the brain and

[1] An abstract of which, full of typographical errors, appears in the Chicago Medical Review, March 20th, 1881.

[2] The Development of the Tissues of the Human Embryo, Chicago Journal of Nervous and Mental Disease, July, 1877.

[3] Histology of New-Born Cortex. Brain, July, 1883, p. 287.

spinal marrow over the peripheral nerves in the form of a single sheath. The whole nerve consists therefore, like the nerve of an insect, only of a bundle of granular fibrillæ which, in pursuing a wave-like course, are placed parallel to each other, and surrounded by their sheath and neurilemma" (Schmidt, op. cit.). He also mentions "mother-cells" packed with larger and smaller nuclei. Multiplication of nuclei by endogenous modes ceases at one stage and gemmation begins.

The nerve-cell is born of the original protoplasmic cell, and is highly productive of granules which form axis-cylinder processes.

Deitl[1] agrees with Mayer in assigning axis cylinder reinforcing properties to nerve-cells, and both consider the sympathetic nerve-cell as a reserve material for the reproduction of the nerve-fibres that have become unsuitable for the transmission of nervous influence. "For their development the nerve-cells utilize the elements of the blood, notably the red globules. We find in the sympathetic in the vicinity of blood-vessels special elements formed of a fundamental substance and numerous nuclei, analogous as regards form and micro-chemical reactions to the blood-globules. The fundamental substance, closing gradually around these nuclei, forms masses of protoplasm which slowly take on the appearance of nerve-cells. These, apolar at first, later present a prolongation which, uniting itself with one or another cell, forms a nerve-fibre." Mayer's researches on the sympathetic, and Deitl's upon other ganglia, make the application general. Kölliker, Beale, and Henle hold the division of nerve-cells into others. Thus not only is the reproductive faculty highly exalted in the direction of axis-cylinder formations, but also for cells of its own kind. It is a simple biological principle, that development of a faculty in one direction involves suppression without necessary extinction of other attributes. It is inconceivable that the nerve-cell should possess two highly differentiated peculiarities. Hence its energy origination must be in abeyance.

Fibres may be and are produced primitively independently of nerve-cells.

The brain and spinal cord of the embyro is one large nerve-cell.

The nerve-cell is not necessary to nerve action, for in the lowest vertebrate there is an utter absence of such cells, the fibres alone affording passage for this form of molecular motion.

Dr. Roler, of Chicago, obstetrician, told me five years ago of a

[1] Sitzungb. der K. Akad. der Wissensch., 1874.

case in his experience of an anencephalous child, whose vigorous kicks in the course of delivery led the doctor to diagnose anencephalism before birth, as he had just read in the *American Journal of Obstetrics* of a similar case of explosive reflex irritability in the delivery of a similar monster. Now, if this is a common anencephalic accompaniment on the basis of nerve-cell genesis of force, how can this be accounted for when the millions of cerebral nerve-cells are absent?

The neuroglia sizes decreasing in the cortex in proportion to their development of fibrillæ (Stilling and Meynert regard the neuroglia as essentially a felt-like substance composed of the most indirect and finest nerve processes), show that sensation and molecular energy, of which the former is one expression of the latter, reside in the neuroglia, and that fibrillar development is the great desideratum in increasing facilities for molecular interchange of a nervous nature. Every cell in the body, every nerve-fibre is capable of molecular motion, and though the nerve-cell is, as Spitzka[1] says, "the ultimate functional centre of the nervous system in man and other higher animals," the parallel fact, which he also cites, that increasing intelligence and co-ordinations go hand in hand with increase of commissural nerve-fibre establishment, show that the increase in fibrillar connections requires the increase in histogenetic arrangements, such as we find eminently provided for by nerve-cell increase.

I regard the olden assumption of autocracy for nerve-cells as the last foothold of that superstitution which pictured fleshless bones stalking abroad at midnight. The sizes of these cells would be in proportion to the stimulation they sustained toward granule parturition, and the immense number of fine fibrillæ near the internal auditory nucleus is a case in point. Cells such as the auditory, and the giant pyramidal of Betz, are certainly under constant strain. When any mechanical, chemical, or electrical irritation suffices to stimulate nerves, the creation of a special stimulating apparatus other than such as exist in amphioxus, dipnoi, etc., would be unnecessary. Golz tacitly admits the direct stimulation of the nerve-fibres without cell intermediation, in criticising Ferrier's experiments.

The associated atrophy of nerve-cells and fibres, such as Davida[2] found in perobrachia (arrested development of

[1] Architecture and Mechanism of the Brain.

[2] Virchow's Archiv, April, 1882.

the forearm) and pathologists frequently find in tract degeneration, bear in the direction of the failure of cell stimulation through nerve destruction, for an organ ceasing to act through want of stimulation will atrophy, but an organ which stimulates need not die because that which it stimulates has perished. The nerve being the stimulator and the cell the stimulated body, nerve-cells may atrophy without entailing destruction of nerve-fibres, except where the so-called trophic relationship exists, which seems to indicate the dependence of the nerve upon the cell for its elements; otherwise Wallerian degeneration of nerves would be centripetal instead of centrifugal. The nerve destruction in this case does not cause cell destruction, but if the stimulating area in which that cell reposed were functionless, the cell would die, *but not the centripetal nerves.*

The diversified shapes of nerve-cells seem to bear relation to the composition of forces rather than diversity of function. The lines in which impinging energies act determine shapes of other tissues, and speculations in this direction applied to nerve-cells would be fruitful. The fusiform bipolar cell could result from forces traversing it; the globular unipolar, from forces terminating in it; the multipolar, from varying quantities of energy acting in several directions; the pyramidal, from having its point of greatest tension at the base, with least resistance at the large tapering process. Always remembering that these cell activities appear to be mainly histogenetic, and the stimulation it receives serves to elongate the process and promote the more rapid formation of nerve-granules and fibrils, *but there is nothing to prevent the cell-contents from acting precisely as do other fibrillæ in the conduction of motion.* The ganglionic bodies Ranvier, Max Schultze, Schmidt,[1]

[1] Schmidt's researches and engravings in the Chicago Journal of Nervous and Mental Diseases, Jan., 1879, are excellent.

Deiters, and others have shown contain multitudes of fibrillæ and granules of minute sizes.

All investigation goes to show the precedence of the nerve-granules which are formed into rows and fasciculi, and that nerve action precedes the appearance of the nerve-cell, the latter is formed at a stage when greater multiplication of granules and fibrillæ proceed, and the cell is formed *from* these pre-existing elements, in my opinion, for the purpose of hastening the granular and fibrillar creation.

Turning now to the chemical constitution of protoplasm and its derivatives which culminate in nerve and muscle evolution, Pflüger[1] has called attention to the great molecular energy of the cyanogen compounds, and has suggested that the functional metabolism of protoplasm, by which energy is set free, may be compared to the conversion of the energetic unstable cyanogen compounds into the less energetic and more stable amides. In other words, ammonium cyanate is a type of a living and urea of a dead nitrogen, and the conversion of the former into the latter is an image of the essential change which takes place when a living proteid dies.

Whatever the exact nature of the molecular translocation of muscular contractility may be, there is undoubtedly a chemical change, with production of carbonic and lactic acids. There are nitrogenous crystals present in muscular tissue, undisputably resulting from the activity of the organic constituents. Hermann's hypothetical "inogene" may be likened in its changes to the isomeric drop of ammonium cyanate into urea. The nitrogenous and non-nitrogenous muscle bases afford the gaseous CO_2, the fluid lactic acid $C_3H_6O_3$, and the crystalline urea $(NH_2)_2CO$, uric acid $C_5H_4N_4O_3$, etc. Hermann's[2] hypoth-

[1] Archiv, Band x., 1875, quoted in Reichert's appendix to Foster, p. 993.
[2] Gamgee's Physiological Chemistry, p. 418.

esis is the most satisfactory, and consists in the falling to pieces of a complex nitrogenous body named "inogene substance;" the products of the decomposition include CO_2, a fixed acid, and a gelatinous albuminous body, of which the first is cast into the blood current, while the last, and possibly the second also, help to build up again the original compound. The decomposition is constantly occurring even during the repose of muscle, but in such circumstances restoration keeps pace with destruction. In contraction, on the contrary, destruction largely exceeds restoration. The blood supplies to muscle the non-nitrogenous matter and the oxygen needed for the reproduction of inogene substance. However the Liebig, Meyer, Voit, Traube, Matteucci, Heidenhain, Hermann controversy may be reconciled, an extension of the hypothesis of the latter to the protagon activities of the brain affords satisfactory analogies. The phosphorized nitrogenous cerebral substance exhales the same gas, CO_2, into the blood, and uses up oxygen as does muscle. Cholesterin bears some such relationship to the nerves, urea and other such crystals do to the muscles, and in the elimination of cholesterin the liver is associated with the nervous system as the kidneys in the elimination of urea and its congeners are with the muscles. The distinction between cholesterin and the urea group seems to be the absence of nitrogen from the former and its presence in the latter. The distinction between protagon and inosine is the presence of phosphorus in the former. The oxidation of the phosphorus and its union with the cyanitics, with liberation of cholesterin and CO_2, with accompanying propulsion of exploded particles apart, the seggregative nerve property, have complementary characteristics in the muscular ammonium cyanogen change to urea and concomitant conversions producing contractions by aggregation of molecules. Such increases and decreases of bulk and specific

gravities in the union of chemical solutions are familiar to tyros in chemistry.

Phosphorus has a great affinity for oxygen, and cyanogen enters into combination with the non-metallic elements, as though it were itself an element. Chlorides, bromides, and iodides of cyanogen are easily formed, facts which have both physiological and therapeutical bearings.

Kopp[1] says phosphorus expands 3.43 per cent at the moment of fusion at 44° C., but contracts like wax and sulphur on cooling. Phosphorus assumes several different forms under the influence of causes apparently trifling. Thus, while in muscles there is combustion and shrinkage, in nerves, there is combustion and explosive repulsion.

The increased cerebral blood-supply during thought and the intoxication produced by oxygen are evidences of the rapidity of protagon interchanges.

The evolution of heat being definite in oxygenation, the more rapid molecular interchange in higher animals is accompanied with higher heat-rate. Electricity is definitely produced also, as shown by Hermann in his inogene studies, and where this had served a useful purpose in perpetuating the life of an animal with a morbid condition of muscular excitability, it is likely enough that natural selection would seize upon it. The heat given out during the combustion of a compound body is less than that emitted by the combustion separately of a quantity of each of its constituents equal in amount to that present in the compound burnt. The amount of heat disengaged by H, CO_2, CHN, Fe, Sn, SnO, and P with equal weights of oxygen is nearly the same, except that in phosphorus it is the greatest.

The heat-rate of an animal is at first only an epiphenomenon, but, like everything else which occurs, must be

[1] Liebig's Annal., xciii., 129.
[2] Miller's Chemistry, vol. i., p. 401.

reckoned as in its environment, initially a product of life, it must be allowed for when it increases the molecular speeds by reacting upon the basis substances. The heat evolved by the animal adjusts the molecular rates, and becomes a part of the life-phenomena, alterations of which entail changes proportionally more or less formidable. Similarly adaptation or readjustment suggests that, in muscular susceptibilities, various stimuli being adopted as a normal, it is conceivable that muscles, as well as nerves, must be considered as educable or adjustable, and become non-responsive to stimuli often repeated through molecular rearrangements. *Muscles hence must vary between themselves as to their selective response to stimuli*, and thus much of the burden of compound reflexes may be greatly lifted from the nervous system.

The protozoon exists in an environment of nitrogen and oxygen, the former inert and the latter a food in its affinities for protoplasmic derivatives. The combined H_2O have a main significance as a vehicle for molecular interchange, facilitating the necessary atomic and molecular translocations. Nitrogen has a persistent tendency towards its free inert state, and this very disposition confers upon it great physiological importance. On the other hand, oxygen has a great antipathy to uncombined existence. These two mechanically mixed ingredients of the air play in biological phenomena complementary parts.

Phosphorus in its assimilable form of the tricalcic diphosphate conveys its bone-producing properties in connection with the attributes of gelatin for its solution. The sudden appearance of large-boned vertebrates in a phosphorite epoch was noted by Prof. E. D. Cope,[1] and Filhol[2] subsequently remarked the same thing. The profound modifications which the paleontologists convince us animal

[1] Hayden's Reports.

[2] Phosphorites of Quercy, 1878.

life underwent through accidental advantageous surroundings undoubtedly include the presence of assimilable phosphorus in plants, and accompanying physiological possibilities for its assimilation. The differences in the excreta of the vertebrate division show that materials made vital to a higher life through systemic absorption and utilization are inert excrementitious matter in the lower animals. Something as a large scientific library in Chicago might answer to kindle fires with, while in the seaboard cities the absence of such a refinement would be fatal to the interests of hundreds of thousands of people in unsuspected ways.

Nitrogen is connected with the phosphorus group by its combination with hydrogen H_3N, and by its formation of anhydrides with three and five atoms of hydrogen.

A gradation of properties is observed in the five triad elements: 1, nitrogen; 2, phosphorus; 3, arsenicum; 4, antimony; and 5, bismuth; 2, 3, and 4 are in order from the least dense, most fusible, and volatile, to the more dense and least fusible and volatile, in ratios of atomic weights; the acid properties of the oxidized compounds are most marked in the first, to scarcely apparent in the last.

The hydrogen compounds follow the same order: Ammonia is a powerful base; phosphuretted hydrogen a feeble base; arseniuretted hydrogen feebly basic, as is antimony, each of the three last-mentioned being in succession more easily decomposed by simple exposure to heat, whilst the attraction of bismuth for hydrogen is so feeble that the hydride is unknown. These properties are mentioned as indicating chemico-physiological realms very little explored by toxicologists. The acidity of muscle and nerve substance in connection with blood alkalinity render possible the conveyance of alkaloids, and make it likely that soluble alkaloidal hydrocarbons of the neurotic group, assimilable by the organism, have suffi-

ciently close molecular resemblances to the acid protagon as to account for their mutual affinities and bio-chemistry.

The differences in the physical attributes of the great neurotics are not apparent in their respective proportions of carbon, hydrogen, nitrogen, and oxygen. There are some marked relationships between quantivalence, atomic weights, numbers of molecules, and physical properties of compounds, as well as in elements; but, aside from such examples as Kopp's law of boiling points of ethers, the temperature increasing with the numbers of CH_2 atoms; in general, the chemical formulæ of substances afford no clues to their *modus operandi* with respect to heat, light, electricity, etc., and comparatively little has been done to tabulate from direct experiments such peculiarities. The rationale of the neurotics and medicines generally is a tempting field for speculation. The bitterness of most tonics, the fact that tannic acid kills paramecia, the alkalinity of ammonia in connection with the acidity of nerves and muscles, the poisonous properties of phosphorus being increased by fatty matters, the nutritive interferences in toxæmia, etc., with such investigations as Spitzka[1] on strychnia would afford the chemist most satisfactory considerations. The carbonization of the blood in hydrocyanic acid poisoning refers to a central toxic action; the "heavy narcotic odor" of opium, in musical parlance, "drones" sluggishly, and indicates its diffusibility. The pigeon's immunity from this poison may refer to its adjustment through its ancestor, the rock pigeon, having frequented the papaveraceæ habitat, and fed upon such plants. Such tolerance is acquired by opium habitués among man, why not in a species or genus? Hensinger, quoted by Darwin,[2] notes that white sheep and pigs are

[1] The Anatomical and Physiological Effects of Strychnia on the Brain, Spinal Cord, and Nerves, Journal of Nervous and Mental Disease, April, 1879.

[2] Origin of Species, p. 18.

differently affected by vegetable poisons from colored individuals. Such differences may be due to the presence or absence of pigment compounds which have affinities for or resist the influence of certain poisons. In the constitution of protoplasm, as well as that of any organic or inorganic compound whatever, there is an ever-present necessity for the *absence* of certain molecular groupings which would destroy the combinations under consideration or cause them to act erratically. The cell environment is reached by adaptability, and in the differentiation of cells it is easily seen that what would be nutrient to one may easily poison another by *a*, combustion conversion complete; *b*, affinities existing between toxicant and the molecules.

The life of the cell depends upon the absence of these deleterious molecules for which there are affinities precisely as there is necessity for somatic absence from fire. Prussic acid presents the simplest example. The nitrogen therein is in a dangerously assimilable form, and its sudden surcharging of the nerve-centres with carbonized blood paralyzes the body.

Herbert Spencer[1] elaborates the anæsthetics' modes of action. No philosophy can explain nerve action by excluding nerve and nerve-centre therapeusis. As certain drugs have specific affinities for certain groups of nerves, it follows that the times of action of such groups differ from others, and in such selective affinities we have indications of the differential molecular workings of both nerves and neurotics. If the cell becomes adapted to a certain environment, and the genus of a certain chemical combination be poisonous, one species of such genus may through adaptation cease to be a poison within relatively restricted limits. A readjustment of the entire body may occur permanently for the race or for the individual on

[1] Principles of Psychology.

the basis of toleration. For instance, phosphorus has been adopted as a normal ingredient of cerebral tissue; but antimony and arsenic in the same group remain as poisonous as phosphorus is to those animals whose assimilative adjustment for it has not reached the stage it has in man.

On the principle that a millionth of an inch is as much of an entity as is a million miles, molecular distances, though unseen and unmeasurable, inferentially exist. The vast range of tissue solidities throughout the body, the coarseness of the deltoid muscle, and structural fineness of other muscles, the varying permeability of organs and their ability or inability to resist molar or molecular motions of graded degrees, the adjusted calibres of vessels to their contents, of cell and cell granules aggregation in dermis, epidermis, lung, liver, serous membrane, and bone, like the callous palm of the laborer, or the bicipital growth of the oarsman, indicate the adjustment of molecular distances to the exercise they undergo. In iron wire the passage of so imponderable an influence as electricity in one direction adjusts the atomic distances in lines of least resistance. This is so well known to electricians that telegraph companies often order their current directions reversed to habituate the flow to indifferent directions. Analogy forbids any other view than that nerve tissue is no exception to this law of adjustability, and that constant causes produce constant effects in creating densities of nerve structure consonant with the work performed. The softness of the "*portio mollis*," the hardness of the other nerves, notably the optic, are significant and seem related to the differences in wave length conveyance. Roughly estimating the comparative densities of the auditory and optic as 1 to 10, the former related to vibrations of from 40 to 4×10^4, the approximate equation is obtained $\frac{75.7 \times 10^{12}}{4 \times 10^4} = 18925 \times 10^6$ for the retardation which the highest light ray, violet, must undergo in comparison to that of the highest note

that is heard. The assumed greater density 10 of the optic nerve dropping the ratio only one power = 18925 x 10, and even were the optic one hundred times denser, the whole differences would not suffice to account for the transformation undergone except by calling in the peripheral apparatus and its rhodopsin. Nevertheless it is evident that the centripetal differences create some changes in densities.

Stieda calls attention to the axis cylinders of the second root of the auditory nerve as thicker than that of any other, the first having delicate fibrils. The second has a ganglion upon it like the intervertebral. What these changes in density measure, and the precise molar and molecular arrangements may be, are, at present, only conjecturable, but their existence is beyond dispute.

The celebrated Chladni figures, made by the action of musical vibrations upon sand arranged on glass plates or membranes, as yet have not had the causes of their appearances being related to their corresponding notes discovered, but the rule is, that *to a determinate note belongs a determinate figure for the same membrane or plate, and that a figure is more complicated as the note producing it is higher.*

The only observable aspect of these figures in the nerves is density, and here we must not mistake gross appearances for intrinsic differences, for connective tissue increase may sclerose. I refer to the densities of the intimate proper nerve substance which cannot always be inferred from simple inspection. The presence or absence of water, fatty matter, protoplasmic soft substance, etc., with the distances apart of granules and the intimate density of the granules themselves, present a complex upon which impinging forces would act to arrange, mould, adjust, and rearrange.

Now the persistency of a force, its frequent recurrence, could not do otherwise than produce a definite arrange-

ment, intermolecular, intergranular, and with regard to extrinsic but associated elements. We are forced to speak of the *arrangement* of a nerve as including its density and the other factors mentioned.

A nerve which has undergone adjustment acts reflexly *instinctively*, and where not only in the individual but in the species impressions constantly recur, the nerve arrangement would be inherited. Impressions common through long periods to all animals would arrange common nerves in common manners. Impressions only experienced by a species or race would differentiate nerve structure therein above the common, provided the recurrence of the impressions were frequent.

Impressions only experienced by an individual result in a reintegration of the nervous system at the expense of disintegration of racial and species adjustment, and such breaking up of inherited arrangements we know to be exceedingly difficult to bring about.

The more perfect adjustment of nerve elements to the transmission of vibrations constitute instinct, and I extend this facility of motion to sensation, feeling, motor muscular activity, and to all mental processes.

Reason or deliberation, or in the spinal nerve action, hesitancy in reflex response is indicative of resistance to the passage of a new set of impressions, the inharmony of the adjustment to the influence causing the deliberation. As soon as the vibratile term most in accord with the impression has been determined upon, the action which follows is the effect of most accordant routes having been selected.[1]

Hammond's dictum, that where there is gray matter there is mind, could be extended to nerves, thence to mus-

[1] Further elaborated in my "Contributions to Comparative Psychology," Science (N. Y.). "Instinct and Reason," May 28th, 1881. "Origin of Language," July 23d, 1881.

cles, thence to protoplasm. Mind is a thing of such degrees that from its evolution in man to its beginning differentiation in the protozoon we can no more demarcate the steps of its growth than we can tell where the seed ceases to be a seed and becomes a tree. Huxley's comparison of the mind to the horologity of the clock is a just one. Stop the pendulum, or derange the mechanism otherwise, and the time-keeping capacity of the clock is in abeyance. Interference with any of the living cells in the body, according to their states of mental integration and relationship, will derange the nervous and mental mechanism and its life-subserving workings, the mind.

Cope assigns mind to the protoplasmic cell; so do I, but in the sense of mind being only on a par with all the other chemical and mechanical motions of the body. It is in the metazoa the co-ordinated activities of the associated cells, of every cell in the animal regardless of development, shape, size, location, or degree of vitality. As Spencer claims, it is inseparable from other vital workings.

As in the amœba there cannot be movement without molecular consumption, nor repetition of this movement without resupply throughout animal life, we see the ability of tissues to maintain their integrated arrangement and yet be subject to waste and repair. This nutrient possibility of maintaining the adjustment, once fastened upon the organism, cannot be denied to nerves, the gross muscular and other persistencies imply molecular arrangement persistence in the face of destruction and rejuvenation. When in the organization of the metazoa definite organs as cilia appear, adaptation to repetition of movement is apparent and each cilium will, in repeating a movement, cause a repetition of associated molecular motions in its sarcode directly related to those motions. Now if with the first repetition of that ciliary motion we grant that similar molecular movements to the initial

motion were reproduced, then we have the necessary conception of *memory*. Let the ciliary motions and the accompanying molecular sarcodal changes continue indefinitely, memory becomes merged into hard and fast lines of energy capabilities, definite molecular translocations, and so far as an animal can or cannot be said to remember an act which is part of its existence and of momentary recurrence, it is conceivable that it would require a decided disturbance of its structure to cause it to forget. But as Ribot[1] points out, we remember by forgetting, and it is through rendering the reflex susceptibilities to recurring stimuli automatic and part and parcel of our structure that we are enabled to integrate this kind of memory with instinctive motion and cease to regard it till disturbance occurs.

An associated molecular change which faintly disturbs the protoplasmic granules concerned in the ciliary motions will thus revive the memory of those movements. Let an internal fortuitous agitation of a sleeping hungry amœba take place, instantly the impression, the memory of eating is revived, through molecular changes induced identical with what occurs in eating, and may provoke appropriate grosser movements, such as protrusion of pseudopodia. This similarly, though with basal identity, occurs in the dreams of the hungry man. The irritations from the viscera produce a tension of the gastric and intestinal distribution of nerves requiring but the faintest correlative irritation from the brain to suggest the feast.

In the diaphragm to diaphragm telephonic transmissions of waves, the plexus of diaphragmatic vibrations oscillate in changed terms along the wire, to be revived at the other end. It is not necessary to have termini alike in the case of nerves, for whatever the initial oscillations may be, their translation into neural movements suffices to revive mem-

[1] Les Maladies de la Mémoire.

ory of similar movements, adjusted to in the cord and brain.

Conceive now of an associated apparatus, by which the telephone line, which we must regard as adjusted to definite waves, has its oscillations revived independently of the usual end apparatus. If these otherwise induced groups of waves be identical with those produced in the ordinary way, then the diaphragm vibrations will be as definite as though ordinarily induced. The phonograph traces its characters upon a metal sheet, and through them the sounds which produced them may be recalled. It matters nothing how these wire vibrations which make both character and sound are generated, if any other influence, similar to that which we know is at work upon nerve tissue, produces identical waves, however feebly both or either characters and sounds may be made. This is intended to represent revivification of memory through association, such, for instance, as occurs in recalling the odor of a rose when an image of the rose is aroused in the mind.

The integrity of related organs, at least for a definite time, is essential to memory. For example, the joints in arthropodal members, and in metazoa generally, differentiate limb movements which adjust the muscular protoplasmic and nerve arrangements after repetition, and thus memory, in common with other attributes of mind, is an osseous and muscular as well as a nervous phenomenon.

It is well known that convulsions so adjust the nervous system as to make their recurrence easier.

Delbœuf[1] adopts this view of molecular adjustment as constituting memory, and doubtless many other suggestions I have made herein have been advocated before, but their synthetical arrangement I shall claim, together with such matters as the nutrient

[1] Théorie Générale de la Sensibilité, p. 60.

reflex, as original. It was at a recent date fashionable to ascribe everything to Aristotle. He was even accredited with suggesting the rotundity of the earth, but it was not mentioned that he, in the next breath, advanced reasons against such an idea.

Wundt, Spencer, and Bain are each close to the truth in their several psychologies, but it is only by elimination of error and adjusting with reference to extensive ranges of facts, that complete consistency will be evolved in such matters.

To read of memory, as described by many writers, one would suppose it infallibly reproduced facts and images; but it does not, it is treacherous in the extreme, and only when cultivated is it free from gross error. In hyperæsthetic states it may reproduce minutiæ, nor is this to be wondered at when we grant it ability to recall anything. In the main it is illusory, and made up of all sorts of superimposed experiences. The limner takes advantage of the readiness of the memory to supply omitted points when he, with a few lines, leads you to imagine you have seen details he did not fill in his sketch.

Memory is an important intellectual omnibus, and, as Ribot says, consists of *memories*, which accounts for the loss of ability to recall certain things only. I would like to epitomize Ribot's excellent work in this connection, but want of space forbids. The inability to recall the letter F, in the case he cites, shows how memorized co-ordinations of muscles may be ineffectual through stimuli failing to act upon a defunct centre for such co-ordination. Harrison Allen's recently invented "palate myograph"[1] would be valuable as an aid in determining the muscles involved and inferentially afford knowledge of the co-ordinations of articulation.

The patient recorded by Dr. Ball,[2] who could not speak certain words he could not hear, had lost hearing memory of words, and could not pronounce them for want of the

[1] American Naturalist, April, 1884, p. 38.
[2] Archives of Medicine, April, 1881.

usual stimuli to such co-ordinations. Finkelburg's[1] suggestion of asymbolia for all phenomena of aphasia is a good one, as it generically classifies these failures of speech and gesture.

I think since Exner's researches have given us better defined notions of a modified localization in the cerebrum that the word registration (of which Spitzka is so fond) expresses the function of the adjustment or arrangement I have attempted to elaborate.

The registration is simply the facile possibility of revivification of the oscillations within the limits of nerve arrangement and revivification of such registered impressions is a memory.

Memory in sensation has its analogue in the motor apparatus and motor inco-ordination, or erratic reflexes may be the congener of amnesia. Kussmaul[2] regards this motor memory as necessary to an explanation of aphasia.

Partial amnesia will be caused by disarrangements of certain tracts.

Temporary amnesia, their temporary failure of adjustment.

Periodic amnesia, also temporary but recurrent, due doubtless to a nutritive failure.

Progressive amnesia, as in senility, the permanent involutional change which, being disintegrative, resists rearrangements at least of a permanent character. The progress is from forgetting proper nouns to common, thence to adjectives and verbs, and finally emotional language and gesture, from the less to the better organized, from the complex to the simple.

Exaltation of memory would follow hyperæsthesia or raise of plane, and in some mania cases both the sensory and motor memories are much exalted.

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[1] Berliner Klin. Woch., 1870, Nos. 37, 38.

[2] Die Störungen der Sprache.

As this paper cannot more than indicate its psychological bearings when the ground work has required so much consideration, we must resist the temptation to revel in the consistencies opened up in the memory field, and pass on to other mental operations, first noting points in that relation which bear upon subsequent matters.

Kussmaul's "Bewegungsbilder" suggests motor as well as sensory registration in the brain and nerves.

The brain, and particularly the gray matter, receives an enormous amount of blood. In no other part of the body is the nutritive function so active or so rapid. The stability of modifications and the dynamic associations between nerve elements can only be produced by nutrition (Ribot, op. cit.).

Between nutrition and retention there is a cause and effect relationship.

The slide-valve cut-off for steam cylinders is an arrangement in sequence, and its action may be likened to that motion of muscles which, reaching a certain point, is followed by related movements of other muscles. Certain acquired motor memories being invoked, are followed by associated memories for other motor apparatus. This acquisition is similar to the sensory-association phenomenon of learning a thing by its connection with some attendant thing or circumstance. One revived impression is apt to call up another. Does this require a special association apparatus or a molecular motion relationship of the sensory and motor events? We know that the first exists and is developed *pari passu* with association powers, but how is association effected? Having the machinery, how does it act? The fibrillæ cross and recross each other, abutting in gray centres and among nerve-cells without decided connections with each other or with the main strands. The resultants of interference vibrations or musical beats are suggestive, but insufficient, for beats cannot revive the notes from which they were derived The arrangements of both fibrils and nerves suggest dif-

fusion, and diffusion it seems to be, with the reservation that, when association by diffusion becomes definite between impressions or motions, tracts are built up through use. The lines of least resistance are the lines associating memories or other faculties, and in the cord those lines are in contiguous levels, the network of Gerlach, and for higher and lower levels the white columns of the cord. Diffusion having built up these tracts, the sensations and motions are correlated by lines which vibrate in unison with the tracts they connect, so that forces from one tract may pass over the commissure and arouse the vibrations of the other tract feebly or strongly. Commissural fibres then are capable of conveying two or more rates common to other fibres with which they are associated. Co-ordinated movements must have fibres capable of being simultaneously and successively vibrated through uniting fibrils in which vibratory movements simultaneously and successively pass which are common to the main nerves stimulated. It is not necessary that each two nerves should have definite association systems, notwithstanding the millions of commissural fibres that exist.

It suffices alone that an impression should in the faintest degree resemble some previous impression to revive associated memory.

Given two simultaneous impressions, optic and auditory, the former abutting in the gyrus cuneus, and the latter in the supra-marginal gyrus, the co-ordination of these impressions would be effected by any pre-existing tracts. Such tracts, upon incessant stimulation, could undergo better definition, and this would seem to involve, not only the building-up of the callosum, but of definite cortical striæ formations, such as Brill[1] noted in the occipital apex. If such tracts were commissural and not due to mere absence of pigment in cortical areas, they would be

[1] AMER. JOURNAL NEUROLOGY AND PSYCHIATRY, May, 1883, p. 220.

what *a priori* one would expect to find relating the "visual" sense (in man the most important) with senses or motions the most frequently occurring.

It may not be necessary that the uniting fibrils should have the tension strength of the united fibrils. We may surmise from the small range of network-fibril sizes that it suffices if the uniting fibril acts at all, in which case the memory latent in each main fibril will be evoked or stimulated when the other two parts act. The most important thing to remember is that the *nutrient reflex* occurs with every cerebro-spinal irritation, the vaso-motor flash of supply to the points irritated. This seems to be the "something else," the *tertium quid* for which psychologists have sought. The auditory and optic centres being stimulated, their respective blood supplies are reflexly stimulated with an increasing disposition to nourish an intermediate tract or to arrange more definitely the fibrils over which the association is made, the stimulation of one sense sufficing to produce faint vibrations of the other.

Motor memories are thus evoked, and both successive and simultaneous motor co-ordinations effected. The same plexus of fibrils answers for association of sensory and motor recurrences.

The agreement of this hypothesis with the structural facts of the brain are, to me, very convincing.

"According to Meynert, the rôle of the cortex is not so much the liberation of motive force as the mediation of sensations of innervation (*Innervationsgefühle*). All determinable function areas which on physiological grounds must be considered to require a bond of association are found to present regional points of contact. Thus the symbolic field (for written and spoken symbols) approaches the fields of the upper extremity of the tongue and of hearing."[1]

Munk and Exner call attention to the tactile areas of the cortex

[1] Spitzka's Review of Exner's Pathol. Researches. JOURNAL OF NEUROLOGY AND PSYCHIATRY, vol. i., No. 2.

being topographically identical with the motor centres of the corresponding periphery.

"*Perception reaches the maximum of clearness in attention*" well says Guiseppe Surgi.[1]

"We hear best in breathless attention," remarks Tuke.[2] A theory of perception thus would best be considered through analyzing attention.

According to my suggestion of nutrient reflexes, the increase of centric irritation would produce an afflux of blood to the part in functional activity. The blood is there because of the work being done there, just as friction calls blood to the skin. Listening to a sound, the sight is not so acute. Interferences between recollections or acute perception of impressions are less when they relate to different senses than when they are terms of one sense. A landscape and piece of music may be enjoyed simultaneously, but not two sights or two kinds of auditory impressions. In "breathless attention" the nutrient reflex not only affords one centre an extra supply of blood for its activity, but denudes other centres, even the pneumogastric, to a minimal supply. Faintness from an overpowering emotion or impression may thus be caused.

In expectant attention, the nutrient reflex anticipates the activity, and the "dilemma period" is shortened, and more so if the thing to be seen, as a red color, is denoted beforehand. Memory recalls the red color, and the optic area is better supplied with blood, while adjacent areas are inhibited vaso-motorially.

Thus, in perception and attention, the vaso-motors are concerned largely.

Sir Henry Holland notes epistaxis increased by attention, and John Hunter was able to produce a sensation in

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[1] Teoria fisiologica della Percezione, 1881.

[2] Influence of the Mind upon the Body, 1884.

a part by fixing his attention upon it. Unzer[1] says: "Expectation of the action of a remedy often causes its operation beforehand." All these are connected with vascular changes. In some, this ability to recall a peripheral sensation is accompanied with increase of blood-supply and heat in the part, another vaso-motor reflex produced by cerebro-spinal centrifugal irritation. I regard this as more an unconscious motor phenomenon, the sensation and vaso-motor act being secondary. Maury, quoted by Tuke, refers stigmatization to a similar cause.

I had hoped to be able to condense my mental analysis notes into the limits of this article, but find it cannot be done, nor even abstracted without ambiguity. I can only indicate here what in the future (circumstances permitting) I will discuss:

The evolution of the emotions and their differentiation from fundamental peculiarities of the amœboid cell, such as hunger[2] and the enemy-escaping reflexes, which crop out in insanity in bulimia and delusions of persecution. The relations of Darwin's serviceable associated habit to the integration of emotions and their development of centres and peripheries for their expression.

Analysis of cognitions as being modes of sensation, and their revivability depending upon memory registrations.

Of feelings as depending wholly upon superimposed, feebly-registered past sensations.

Of reason as involving fully evolved reflex systems.

Of instinct as being the outcome of reason, and depending upon an acquired or inherited stability of reflex systems (Spencer's idea).

Of "the will of the individual being the co-ordinated wills of the component cells" (Foster).

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[1] Principles of Physiology, Sydenham translation.

[2] Hunger, the Primitive Desire, Science, Jan., 1881, in which I attempted a physiological fusion of hunger and sexual desire.

Of consciousness being the result of sensation summation, past and present, on the plane peculiar to the individual.

"It is exclusively connected with the functional disintegration of the central nervous elements; its intensity is in direct proportion to this disintegration, and simultaneously, in inverse proportion to the facility with which each of these elements transmits to others its functional vibrations, and with which it relapses into repose, into integration. . . . *Its intensity is in an inverse ratio to the facility and rapidity of central transmission.*"[1]

Of pleasures and pains being comparable to Euler's "consonance and dissonance." The simpler the terms in which the order expresses itself, the greater is our delight. Hence the superiority of the simpler ratios in music over the more complex ones."[2]

Analyses of the cortical and general ganglionic relations of mental and nervous operations, based upon the labors of Spitzka, Exner, Meynert, Munk, Ferrier, etc.

Of the mental and nervous diseases in their most extended aspects. Insanity and its modes of exhibition and pathology to be especially considered.

Of the phenomena attending sleep.

Of Herbert Spencer's psychology with its valuable fund of facts and deductions.

One of the most general inferences I have been able to reach may be put into the words:

The mind consists of sensations and the revivability of sensations.

All psychic phenomena have these as their bases. Feelings, cognitions, reason, volition, etc., being mere modes of working of sensation and memory.

The necessity which Spencer and Bain regarded as excluding sensation, and taking account in mind of cogni-

[1] Extract from a very able article by Prof. A. Herzen on "The Physical Basis of Consciousness," Journal of Mental Science, Apr., 1884.

[2] Tyndall (Pythagorean Harmony, etc.), On Sound.

tions, and feelings, and their revivabilities is, I hold, purely artificial. These are not only dependent upon sensations and evolved from them, but are modes of and inseparable from sensations.

As a humanitarian and therapeutic inference from the dependence of mental upon identical nervous processes, I hold the great necessity for the *relief of psychic pain.* Melancholia, mania, etc., are but symptoms of grave bodily and cerebral disease, and precisely as in peritonitis, pain is the guiding symptom for therapeutic succor; it is no less an indication for constant antagonism of destructive cerebral disease, whether primary or secondary, of which psychic pain is as symptomatic as general pain is in more evidently bodily disease. Ergot, conium, opium, stimulants, etc., with intelligent and humane care of the insane, are powerful aids toward bridging over the dangers which threaten the mind. The cyclical nature of many forms of insanity is as well marked as it is in typhoid fever, but where resolution and reorganization in hepatic or pulmonary tissues interfere with a function less related to mental integrity, that in the brain tissue leaves its mark for all time upon the psychic life. Hence the invasion should be fought from the outset, so as to limit the necessity for reorganization as far as possible. Every step of insanity should be contested; sleeplessness, furor, convulsions, overwhelming grief or excitement should be allayed constantly and judiciously with the powerful therapeutic agents at our disposal. Even in so hopeless a psychosis as paretic dementia, I have known remissions to be prolonged by such treatment, and for the time being the patient was capable of making provision for the future of his family. If we are ever able to rescue a victim of this terrible malady, it will be through such intelligent incessant watchfulness and treatment, and never through the prevailing *laissez faire.*

AMELIORATION OF PARETIC DEMENTIA AFTER EXTENSIVE SLOUGHS.

BY

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IN the report of the Eastern Michigan Asylum for the biennial period ending September 30th, 1882, Dr. Hurd, discussing the subject of paretic dementia, alluded to the occurrence of extensive sloughs as apparently producing an amelioration in the symptoms of two cases which were admitted at a stage of the disease when it seemed that no improvement was possible, and as these cases were regarded by many of interest, it is thought best to report them at length, and collate them with others previously reported. Cases in which improvement in paretic dementia occurred subsequent to inflammatory processes, artificially produced or occurring naturally, are far from exceptional in the literature. Esquirol[1] reports a case of recovery subsequent to the appearance of three crops of furuncles which resulted in abundant suppuration; the patient improved from this time, and remained in apparently good health till the time of his death which occurred five and a half years after from cerebral hæmorrhage. Baillarger[2] reports the case of a paretic dement who was fast passing into extreme dementia when he was suddenly attacked by successive crops of furuncles, which gave rise to a seemingly exhausting suppuration. From the time

[1] Maladies Mentales.

[2] Annales Médico-Psychologiques, 1849.

of their appearance the patient improved mentally, and was finally lost sight of, apparently recovered. Pliny Earle[1] has had under observation a case which recovered in consequence of a seton in the neck and numerous body wounds setting up abundant suppuration.

Baume[2] has reported a case of recovery which came on subsequent to a slough of the leg, and which had lasted, when lost sight of, six years. He also reports another case in which an acute œdema of the leg, followed by gangrene and sloughing, produced improvement and seeming recovery; the patient being too soon lost sight of to speak positively on the last point. Baillarger,[3] some years subsequent to the date of the case cited, reported recovery in a female paretic dement secondary to a large abscess affecting the right leg, which recovery had lasted more than a year when the patient passed from observation. Morel[4] has reported a case in which an extensive hepatic abscess was followed by recovery from paretic dementia.

Combes[5] has had under observation a case of paretic dementia in which improvement and recovery followed upon suppuration in the middle ear. Baillarger[6] and Fabre[7] have each reported a case in which recovery from paretic dementia occurred in consequence of a thigh amputation followed by abundant suppuration, and a very similar case is cited by Voisin.[8] M. J. Christian[9] reports two cases of paretic dementia in which the mental and motor symptoms disappeared together, after extended suppuration.

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[1] Amer. Journ. of the Med. Sciences, 1856.
[2] Thèse de Paris, 1850.
[3] Annales Médico-Psych., 1854.
[4] Maladies Mentales.
[5] Thèse de Paris, 1856.
[6] Annales Médico-Psych., 1856.
[7] Ibid., 1857.
[8] Op. cit.
[9] Annales Médico-Psychologiques, 1880.

Vallon[1] says: Traumatism of the soft parts in paretic dements often gives rise to abundant suppuration and, whether followed by suppuration or not, often exercises a beneficial influence on the paretic dementia. Nasse[2] has reported a case in which recovery from paretic dementia occurred secondary to small-pox. Fritsch[3] has reported a case of improvement after erysipelas. Kiernan[4] and Madigan[5] have reported cases in which crops of abscesses following upon vaccination in paretic dements temporarily ameliorated the psychosis. Savage[6] has reported marked amelioration in a general paralytic following a severe carbuncle. The cases to which I desire to call attention are as follows.

CASE No. 1.—Male, age 40; married, native of Michigan; formerly hotel proprietor and of average business capacity. His mother was intemperate and her family were subject to phthisis. He himself was formerly intemperate and licentious; had been reckless and improvident in his expenditures, and led a fast life. After marriage he reformed and became sober and industrious, but did not succeed in accumulating property. No history of syphilis. He was admitted to the Eastern Michigan Asylum in the early part of *December*, 1880, and had at that time been suffering from mental infirmity for upwards of two years. In the first stage of his disease he was depressed and idle and indifferent to business. In this condition he remained for a year, at the expiration of which time he developed delusions of grandeur. He acquired flesh meanwhile and his bodily health improved, but his mind grew progressively weaker. Previous to admission he

[1] Thèse de Paris, 1882.
[2] Irrenfreund, 1870.
[3] Jahrb. für Psychiatrie, B. iii.
[4] AMERICAN JOURNAL OF NEUROLOGY AND PSYCHIATRY, 1883.
[5] Chicago Medical Review, vol. iv.
[6] Journal of Mental Science, vol. xxvi.

had remained in bed for several weeks and had shown a great tendency to sleep.

He was received in the advanced stages of paretic dementia, his condition being as follows. Weight one hundred and seventy-seven pounds; height medium; bodily health fair; eyes and hair light; pupils contracted but unequal, the right being the larger; skin dry; temperature 99°; articulation thick and indistinct; gait ataxic, expression dull and sleepy, fine facial lines absent. He replied to questions in a drawling way showing slow and imperfect mental action. At times his replies were wholly irrelevant and meaningless. He entertained delusions of grandeur and thought himself in perfect health.

For about one month after admission he was depressed. Much of the time he sat quietly alone, apparently engaged in reading. Again he showed stupidity and torpor; was dull, anxious to go to bed, and would fall asleep even while eating. Extreme debility and paresis were present. He required assistance in dressing and constant personal attention. His articulation was clumsy and his mental action weak. This condition passed over into elation. He became mischievous, threw clothing from the windows, ransacked bureau drawers, and appropriated property belonging to others. Finally, he grew so annoying, and his presence became such a source of discomfort to quiet patients, that he was transferred to a hall occupied by those who were disturbed. He uttered delusions of an extravagant nature.

January, 1881. On the 6th of this month, he sustained an apoplectiform seizure accompanied with choreiform movements of the head, twisting of the mouth, protrusion of the tongue, and tossing of the arms. Temperature in the axilla 103°; pulse rapid; pupils contracted; movements of the arms could be restrained by holding. He was treated by the use of bromide mixture and chloral, slept a little,

and on the following morning was able to take breakfast. 10*th*. Continues in bed, but is fairly comfortable, no return of convulsive movements. He is eating well and feeling "first-rate."[1]

Reg. prescription, barium chloride, gr. 3; cinchonidia sulph., gr. 2. 14*th*. He sits up and pretends to read a paper. 21*st*. Visited by an old acquaintance. He does not appear to know him. His habits are excessively untidy. 28*th*. Transferred to a hall occupied by quiet demented patients.

February. Able to be about, quiet but extremely feeble in mind, inclined to sit alone, inappreciative of what is said to him; replies drawling and indistinct, gait feeble. He has sudden impulses to do violence, and has injured his hand by striking out a glass. His handwriting at this period is totally illegible.

March. Is again elated and extravagant. He forms strange intimacies; has several fast friends among feeble-minded patients to whom he promises work at immense wages.

During *April* he suffered from rheumatoid affection of the joints (arthropathic) of tedious progress. He was confined to bed and grew debilitated. There was tendency to engorgement of the right lung. Treatment in the main supporting. Rapid improvement in these symptoms followed the use of cinchonidia salicylate prescribed in the latter period of the affection.

May. Is able to be about.

June. Is better mentally than at any time since he came under treatment: is quiet, appreciative, and able to care for himself. He attends chapel and entertainments, is neat in dress, and shows a disposition to assist in work; can remember names. The improvement followed the formation of a large gangrenous slough on the left heel

[1] Sheppard: "The verbal formula of a hopeless malady."

which developed in consequence of the lowered vitality of the part and the effect of position during his late illness. His articulation and gait are much better. He copies from a newspaper as follows:

The Harrisburg and Jacksonville road is making contracts for live stock from Kansas city to Chicago at $12.50 per car when the tariff rate is $60.

Continues to take cinch. salicylate in pill form gr. iiss. t. i. d.

July. Brought forward to the reception, or second convalescent, hall. He is able to write letters. His mind is quite clear. He is contented and cheerful. There is no trace of delusions.

August. Brought forward to the convalescent hall. He thinks himself well enough to be discharged, but is not strenuous about going away. He writes as follows:

The Chicago nine beat the Detroit club by 17 to 0 Providence defeated Boston by 12 to 6 and Buffalo laid out Cleveland by 8 to 7

September. He is industrious and pleasant; enjoys the freedom of the grounds; plays croquet and takes regular walks in the open air; has been taking a bitter tonic which is now discontinued. He has had one attack of indiges-

tion during the month, but otherwise has been well; has grown fleshy.

October. Progressive mental improvement. He is quite proud of his ability to write and gives several specimens of left-handed penmanship.

November 1881. During the month he had two attacks of indigestion which produced considerable temporary prostration. Reg. prescription bitter tonic, ʒ ij.; acid phosphate, ʒ i. He is extremely industrious. 25th. Removed by his wife on trial. She regards him well. He believes himself fully restored to health. His mind is not strong, but the progress of his disease seems arrested.

After his return home, he was employed in the care of horses in connection with a hotel. He had limited endurance, but was able to contribute materially to his family's support.

In *December*, 1882, *thirteen months after his discharge*, he visited at the Asylum, when the following note was made of his condition: "He is in good flesh and seems as well mentally as when he left the Asylum. He says he is at present out of employment, but that he has worked more or less since his discharge. He exhibits a pleasant interest in the institution. Until recently he has had no trouble with the heel on which the slough appeared. Lately he has on several occasions experienced pain in the cicatrix."

Present condition, April 3d, 1884. He has improved mentally. He states that he has been out of employment but a few months since he left the Asylum. He is troubled with catarrh, but further than this is in good bodily health. He has not required any medicine. Weight about 165 pounds. There is not a trace of paresis in his speech or gait, and his hand-writing shows no irregularity. He has full control of a livery stable and earns good wages. He

keeps his employer's books with accuracy, is correct in his accounts, turns over the proper amount at each time of settlement, and performs efficiently all the duties assigned him. His memory for both remote and recent events is good. His relatives notice that his disposition is not what it formerly was. Once he was passionate, somewhat irritable, and quick-tempered. Now he is invariably good-natured. His habits are perfectly temperate and regular. His hand-writing is unusually legible and uniform.

CASE No. 2.—Male, age thirty-seven, lawyer; hereditary tendency to mental disease denied; no history of syphilitic infection. He used tobacco excessively and had been licentious; habits otherwise correct; disposition genial; temperament sanguine. He showed ability as an attorney and was moderately successful from a financial point of view.

When admitted to the Eastern Michigan Asylum, in *July*, 1881, the statement was made that he had been breaking down for about one year. He had made a show of practising his profession, however, up to within a few weeks before his admission. Mental disturbance was first manifested through an inordinate sexual desire and the existence of extravagant delusions. He gratified his passions by natural as well as unnatural methods, and required constant attention to prevent masturbation. A few days before admission, he became violent, and required to be placed in jail. He believed he could make gold and diamonds, and that he had been commanded to "raise a new Jesus and to be a Joseph." He was brought to the institution by an officer who reported that his conversation was very filthy, and related almost exclusively to the carnal relation of the sexes.

Condition on admission as follows: height 5′ 11″, weight 139 pounds; anæmic; personal appearance untidy; temperature normal; pulse 96, small, irregular, and feeble;

bodily health apparently reduced, though it was stated that he was as well as for several months before; expression confused; absence of fine lines of the face; pupils equal and contracted; skin soft and moist; tongue pale; speech drawling and thick; gait ataxic; mental action confused; slight incoherency. He stated that his hearing was poor in consequence of concussion of the brain while in the army; was extravagant in conversation and entertained impracticable business schemes of great magnitude. His manner was dull and preoccupied, and his expression of countenance indicated mental impairment. He was shockingly profane in conversation, and when remonstrated with on this account, used foul language.

He remained bewildered several days after admission; desired to go away to look after his railroads; was inclined to lie down, to overturn beds, to pound on doors, to injure furniture, and to remove his clothing. He rummaged in bureaus, collected property belonging to others, and destroyed library books.

July 24th. Restless; says he loses thousands of dollars by being here; is still inclined to noisy demonstrations and requires to be transferred to a hall for disturbed patients; pupils small and do not respond readily. Reg. prescription, barium chloride, grs. 2; hyoscyamin, gr. $\frac{1}{24}$.

August 4th. Weight, 138 pounds. He is less confused and quieter. He has had a ravenous appetite. A diet consisting mainly of potato with, as far as practicable, a withdrawal of highly phosphorized foods, is prescribed.[1]

7th. Transferred to a quiet hall. He says that he has a

[1] In the Journal of Mental Science, vol. xxii., page 82, Dr. Isaac Ashe, under the head "Some Observations on General Paralysis," cites the taking of highly phosphorized diet as an important factor in the causation of paresis and alludes to the almost complete absence of this malady in Ireland where the potato forms the main food. With a view to ascertaining the relations of the withdrawal of phosphorized foods to the progress of the disease, this regimen was adopted.

great invention for tubular locomotion. This consists of two glass balls twenty-two inches in diameter. One ball is fastened to a pole; the other is "a solid globe, with the exception of four little holes for the admission of air and water where the friction occurs." The "capacity" of this apparatus is one thousand miles a minute. His conversation is incoherent and he speaks of going "to the end of the universe at the end of a spark." The idea about his apparatus he claims to have got from the "American Industrial Institution at Hartford." Pulse 84 and more regular; both pupils contracted, but the right one a trifle larger than the left; tongue coated white; skin dry; appetite good. He passes urine regularly and the quantity is large; is wakeful at night.

His hand-writing shows tremulousness and irregularity in the construction of letters, as well as confused mental action.

He claims that writing too much has broken him down, and for the first time shows some appreciation of the fact that he is not well.

Electricity used as follows: the constant current, eight cells strength, applied to the head; the same, of sixteen cells strength, to the spine; to the extremities the secondary current. During the passage of the current through the negative pole in the auriculo-maxillary fossa to the vertex, he complained of haziness of vision, as though he were looking through steam. Cold sponging employed night and morning. After two electrizations made on the 4th and 10th of August respectively, it was observed that his pupils were a trifle larger and his skin decidedly cooler.

August 15th. Tendon reflex cannot be obtained, owing to muscular rigidity. His tongue deviates slightly to the right and is coated; pulse 90 and somewhat feeble; skin cool and pupils contracted; temperature 98½°; mental action more

feeble; is unable to follow the simplest directions in regard to dressing and undressing; is totally unable to work; is restless and constantly inclined to go about from one bed to another, lying in each one. 17*th*. Habits very filthy; is noisy, loquacious, and confused. He talks and laughs to himself. 18*th*. He can neither dress nor undress himself properly. His conversation is, for the most part, incoherent and meaningless. He is very erotic and talks much about the female sex. Pulse 96; temperature normal; skin cool; pupils contracted; tongue tremulous; appetite good. 27*th*. Electricity, which has been used once in three or four days in the manner above referred to, is discontinued. He has steadily lost ground and has become very noisy and mischievous. Is greatly disturbed at night and requires an hypnotic regularly. 29*th*. He requires to be returned to a hall for disturbed patients.

September. He masturbates openly, and his excitement is increased by this cause. He is prone to remove his clothing and quickly strips himself to the very skin, unless carefully observed. He believes he is Jesus Christ. There has been no decline in bodily health; his weight continues at 138 pounds.

October. During the latter part of *September*, and for the first few days of *October*, he suffered from retention of urine. The bladder was relieved twice daily by the introduction of the soft catheter. On the afternoon of the 2*d*, he sustained a mild paretic attack. He became pale, weak, and momentarily unconscious; required to be placed in bed and to receive a stimulant. Reg. prescription, cinchonidia sulphate grs. ij. t. i. d. On the following day, (3*d*) was found to have an inflamed testicle, and was kept in bed. He took food poorly and was feeble. On the 4*th* his pulse was rapid and weak. He refused medicine; took no solid food, but drank milk. 5*th*. Cystitis developed. A large amount of muco-pus is mixed

with the urine. Opiates are given conjoined with mild diuretics and demulcent drinks. *6th.* About one-half of the liquid in his chamber is found to be muco-pus. *7th.* He is very low and does not take food well. His pulse is weak and rapid and great anxiety is felt about him. He attempts to assault his wife who comes to visit him, because she desires him to take food. It is impossible to obtain any of his urine for examination, as he passes it in bed. He frequently soils himself and requires the greatest amount of personal care. His condition is very wretched. *10th.* Is much better and takes food well. The orchitis is subsiding. There is no abdominal tenderness, and he says that he is in "perfect health." Since yesterday he has taken gruel, milk toast, and egg; previously took only liquids. *14th.* His urine is intensely alkaline, contains pus and is of a horrible odor. His bladder is washed out with a weakly carbolized solution. He bears the operation well and expresses himself, half an hour afterwards, as feeling very comfortable. He takes milk punch regularly. Lives almost exclusively upon milk; takes mucilaginous drinks in which citrate of potash is dissolved, ad libitum.

From the *16th* until the *21st* he was in a highly critical condition. During this time, an abscess formed in the right side of the scrotum and discharged anteriorly a little above the testicle. The discharge was of an intensely offensive odor. The abscess cavity was syringed out with a weakly carbolized solution. It was difficult to keep him comfortable, owing to the constant dribbling of urine. His genitals and thighs were excoriated. *24th.* There is a small but constant discharge of pus, and considerable induration of the testicle still exists. Dribbling of urine continues; expectoration is profuse and of a bad odor. He expectorates upon his person, the floor, and bed. He

has a large bed-sore over the sacrum which developed with great rapidity.

From the last date until *November* he seemed to suffer from acute pain in the back, although in reply to questions he said that he had no pain, and that he felt well. He took very little solid food, but plenty of milk-punch, milk, and gruel. Required constant personal attention night and day; was visited twice by his father. He knew him, but would not converse; showed irritation when pressed to do so, and shrieked aloud; threw himself against the wall in the presence of his father and hurt his back. His bed-sore rapidly enlarged, and finally assumed immense proportions. Large sloughs required removal. He became emaciated and constantly lost ground physically.

November 1st. He requires the utmost personal attention and is slowly failing. His bedsore has not enlarged, but is becoming deeper. Death at an early day is apprehended. *5th.* The destructive process has been arrested. The slough has separated except in the centre, leaving a sore irregular in outline and about 3 x 4 inches in size. A portion shows reparative action. *18th.* Contrary to all expectation, improvement continued in the bedsore and in his general physical condition, though there was none in personal habits.

December 29th. He has attacks of diarrhœa every few days, which add greatly to the trouble of caring for him.

January 7th, 1882. Is more quiet and far less irritable than formerly. His appetite is good and he is gaining in flesh. The bedsore is no larger than a silver dollar. He is able to sit up and take his meals in the dining room. His appetite is voracious; gait feeble. *30th.* He spends the most of his time in reading and expresses much pleasure at being no longer confined to bed.

April 3d. Has steadily improved since last note. Is quiet, orderly, and usually pleasant. He has, however,

no appreciation of his past or present mental condition, and asks repeatedly to be examined and sent home. He does not express extravagant delusions. He addresses an envelope in a business-like style.

May 18*th.* Is quiet and sits by himself in his room much of the time. Is given to gesticulating. 19th. Visited by friends and demands that he be removed from the institution. His conversation is coherent; his statements plausible; he shows scarcely any difficulty in articulating; can stand erect with his eyes shut and moves about easily, showing little ataxia. He executes fine movements with considerable precision.

June 3*d*, 1882. Removed on trial.

March, 1883. Returned to the institution after an absence of nearly nine months. During the time he made a pretence of practising law, but was unable to accomplish much. In a newspaper notice in respect to his condition, published several months previous to his return, it was stated that his mind had improved, but that he still gave ample evidence of "being out of balance." For several months previous to readmission he made himself a great annoyance in the courts by issuing fictitious papers and instituting law suits against one person and another. He also insisted upon his right to address the court in season and out of season. On his return he was irritable and spoke to no one. He remained for about a fortnight moody and preoccupied, talking little and taking a very small quantity of food. *March* 15*th.* Weight 130½ pounds.

May 21*st.* He converses but little, but seizes every opportunity to scold the medical superintendent for his detention, and uses profane language. He sits alone with bowed head, and does not speak.

November 8*th.* Is at times menacing and threatening;

spends much time in writing or printing; is cross when asked to exhibit his manuscript.

December 14th. A table knife is found secreted on his person. He replies evasively when questioned as to what he purposed doing with it.

March, 1884. His bodily health is as good as at any time since his return. He is tolerably pleasant toward his associates unless annoyed, but he denounces the officers for his detention in the institution. There is some clumsiness in articulation, thought to be a natural condition. None of the former thickness and indistinctness is noticeable. He gets about easily, takes long walks daily in the open air, and shows no inco-ordination of muscular movement. He refuses to permit the physician to make any investigation of his condition, and brushes his hand away when he endeavors to examine his pulse. His attendant succeeds in counting it and reports the number of beats per minute to be 98. He also induces him to stand still and to walk both backwards and forwards with his eyes closed, and finds that he performs these acts with perfect ease. His printing and writing are distinct.

The query has naturally arisen whether it might be possible by artificial means to cause a destruction of tissue in some part of the body and thereby arrest the progress of the disease. As will be seen from the case cited from Pliny Earle, the earlier American alienists were of this opinion. Voisin has reported several cases in which improvement followed upon the use of vesicatories, and has claimed some cases of recovery therefrom. L. Meyer[1] has lately revived the old method for which so much was claimed by Jacobi. He shaves a half-hand-sized space over the great fontanelle. Into the centre of this space he rubs a circle, about the size of a quarter, with antimonial

[1] Berlin. Klin. Wochen., No. 21, 1877.

ointment. This is repeated at the end of twenty-four hours, using a piece of ointment the size of a pea. After the first energetic application of the ointment, the reddened surface is covered with a linen compress smeared with the same ointment. The second friction is done more carefully. These two frictions usually prove sufficient. In the course of three or four days tumefaction of the scalp spreads, usually to the face, rarely to the occiput or nucha. The pustules resulting are small, and dry rapidly. After the swelling is intense, it may be covered with warm poultices. The suppuration is so abundant in a few days that the integument is separated and sloughs off spontaneously, which takes fifteen days; too resistant adherences are destroyed by scissors or caustic. Baths are forbidden. For two or three months the wounds are treated with basilicon ointment. When the suppuration becomes extensive, the symptoms of cerebral pressure disappear. The periosteum may be affected, and exfoliation of the bone occur; to these Meyer attaches no importance, although Sander[1] lays great stress upon them. Of fifteen patients thus treated, eight recovered, but one relapsed after two years; improvement was manifest in all the cases treated. Olbeke[2] has had somewhat similar experience, although not so favorable, from the use of an ointment composed of hydrarg. bichlor., powdered cantharid., liq. stib. chlor., of each one part; ung. basil., four parts. Of the five patients thus treated, two died rapidly without change; two improved physically, but not mentally, and death followed a few months after the cicatrization of the wound. In the fifth case there was a decided change in the motor symptoms, but dementia continued its course, the patient dying five and a half years after.

Such procedures seem worthy of trial in an affection so

[1] Allgemeine Zeitschrift für Psych., 1878.

[2] Allgemeine Zeitschrift für Psych., 1881.

fatal as paretic dementia, but he who attempts them in the United States must be ready, from the sentimental tendencies which are at present much too prevalent, to face a charge of cruelty, and prepared for all sorts of misrepresentation. If such measures are to be adopted, the full consent of the patient's friends should be obtained.

For the bibliography of this subject, as well as for the above observations upon treatment, I am indebted to Dr. J. G. Kiernan.

ON COUGH AS A SYMPTOM OF DISEASE.

BY

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COUGH is one of the normal conservative actions of the animal body; under abnormal circumstances, it may become a symptom of disease. It is, primarily, an expulsive effort, having for its object the removal of some foreign, or offending substance from the air passages.

It is analogous, physiologically, to the efforts made by the hollow viscera of the abdomen and pelvis, to extrude their contents. As the introduction, into the stomach, of an irritating substance is followed by violent muscular contractions, both on the part of that organ itself, and the muscular abdominal walls, or, as the presence of foreign matters in the rectum leads to forcible movements, which result in their expulsion, so the obstruction, partial or complete, of the respiratory passages, calls forth sudden and violent expiratory efforts calculated to remove it.

A cough is a quick and forcible expiratory effort, accompanied by partial closure of the glottis, and preceded by a more or less forcible inspiration.

The mechanism is as follows: When a foreign body or other irritant comes in contact with the peripheral expansion of the pneumogastric nerve, impulses are generated, which, travelling along the afferent fibres, are conducted

[1] One of a course of Lectures on Symptomatology, delivered before the Chi Phi Delta Fraternity, at the Long Island College Hospital.

to the *respiratory* centre, in the medulla. In the ganglion cells of this centre, the impulses are translated into others which are conducted, through the efferent fibres of certain spinal nerves, to the muscles of expiration, whose force they liberate. Why the motor impulses going forth from the respiratory centre should be *expiratory* is a question which can only be answered after a thorough study of the evolution of the respiratory apparatus. The expiratory act of coughing does not differ from that of labored breathing, except in its rapidity and force. The same muscles contract, the changes in the thoracic walls are the same, and even the partial closure of the glottis, which is observed in ordinary respiration, is present, though intensified. There is, however, this difference between the approximation of the vocal cords in cough, and in respiration, that, whereas, in the latter, it is almost entirely passive, in the former it is active and spasmodic.

The effect of this explosive effort upon the lung is important, for, although under normal circumstances it seldom has any injurious effect, its frequent repetition, under pathological conditions, may be, and often is, followed by the most disastrous consequences. In order to clearly understand these, it is necessary that we should carefully analyze the act.

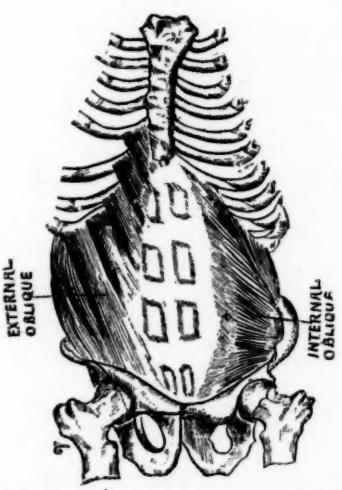
A study of the muscular relations of the thoracic walls shows that, while the muscles of *inspiration*, with the exception of the diaphragm and some small ones, such as the *levatores costarum*, are attached to and act upon the upper ribs; the *expiratory* group make their principal traction on the lower ones. This remark applies, particularly, to those auxiliary muscles which are brought into play in forced respiration. As we are particularly interested in the expiratory phase, we may confine ourselves to that group.

They are, anteriorly and laterally, the *triangulares sterni*

above, and the *recti*, *obliqui*, and *transversales abdominis* below. The action of the *triangularis* is simple, and does not require special notice. Arising from the sternum and ensiform appendix, its fibres pass upward and outward, to be inserted into some of the costal cartilages. It simply reinforces the natural resilience of the cartilages, helping to restore them to the expiratory position. It may also have some effect in counteracting the displacing force of the muscles on the exterior of the chest, the *pectoralis minor*, for instance.

The action of the *rectus* is equally simple. Its sole influence over the respiratory movements is to draw

Fig I



Diagram, showing the relations of the oblique muscles of the abdomen. The line of traction, from the iliac crest, on one side, to the costal cartilages, on the other, is apparent. (*Original.*)

the sternum and ribs down, and so, to diminish the size of the abdominal cavity.

The action of the oblique muscles is more complicated. In the first place, their posterior portions, which pass directly from the crest of the ilium to the ribs, exert an immediate and powerful downward traction upon the

thoracic walls, tending not only to lessen the capacity of the abdomen, but acting as adductors to the ribs, which have been put in the position of abduction during inspiration. In the second place, the more anterior portions have a crossed action, exerting mainly a diagonal traction across the abdomen. This has been well described by Prof. Henle.

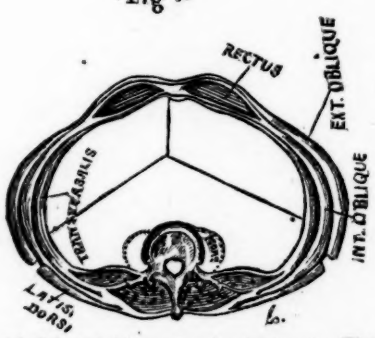
It will be seen, by reference to the chart (Fig. 1), that the upper portion of the external, and the lower portion of the internal oblique, of opposite sides, attached as they both are to the intervening sheath of the rectus, are equivalent to one long, diagonal muscle which, taking its origin from the costal cartilages of one side, is inserted into the iliac crest of the other side, or *vice versa*, and is capable, by its contraction, of drawing the ribs downward and inward, so as to contribute, directly, and with great power, toward the expiratory diminution of the thoracic cavity. It acts on the abdominal cavity as well.

The function of the transversalis is equally important. Its middle portion is attached, by a strong fascia, to the transverse processes of the lumbar vertebræ, while the fibres below arise from the iliac crest and outer part of the ligament of Poupart. Above, it has a firm attachment to the inner surfaces of the costal cartilages, interdigitating with the points of origin of the adjacent portion of the diaphragm. The fibres of this part of the muscle pass horizontally across the abdomen, so that, by the interposition of their aponeuroses, and their mutual attachment at the *linea alba*, one continuous muscle is formed, attached on either side to the lower costal cartilages. The contraction of this double muscle will exert a powerful adducting force upon the lower costal cartilages; it will diminish the epigastric angle.[1] The middle portion of the trans-

[1] By the *epigastric angle*, I mean the angle formed by the cartilages of either side. It forms the boundaries of the space known as the scrobiculus cordis, or

versalis exerts its influence directly upon the abdominal wall. This is best illustrated by a view of transverse horizontal section of the trunk, just above the level of the umbilicus. Such a view is presented in the diagram (see Fig. 2). It will be seen, from a study of this figure, that, in the lumbar region, there is a large amount of white fibrous or aponeurotic tissue. This tendinous mass is attached below, on either side, to the ilium and sacrum; above this, to the spinous and transverse processes of the lumbar vertebræ. Its lower and more superficial parts give origin to the large muscles of the back, which will be described presently. Its deeper layers, attached, as the diagram indicates, mainly to the transverse processes, surround and

Fig 2



Transverse section of abdomen (*from Gray's Anatomy*). The straight lines in the interior of the figure indicate the displacement of the *linea alba* backward, when the bilateral shortening takes place. The antero-posterior diameter of the abdominal cavity is considerably exaggerated in the figure.

give origin to the deeper muscles of the loins and abdomen. The fibres of the transversalis take their origin from that plane of tendinous fibres which springs from the transverse processes; they pass outward, forward, and then inward, to be inserted, by means of their fibrous continuations, into the linea alba, or central tendon of the abdomen.

The old anatomical rule, that the result of the contraction

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pit of the stomach. This angle is increased during inspiration, and diminished during expiration.

of any muscle is to approximate its points of origin and insertion, holds good in this case. In its contraction the transversalis acts from the outer border of the *quadratus lumborum*, as that muscle fixes its tendon in the lumbar region.

It tends, first, to draw the *linea alba* toward this fixed point, but the antagonism of the muscles of the opposite sides prevents lateral displacement, and simply allows the anterior abdominal wall to approach the vertebral bodies, shortening the antero-posterior diameter. At the same time, the muscular fibres intermediate between its anterior and posterior attachments, which, during distention of the abdomen, are sharply curved, become straightened, thus making strong lateral compression. This contraction of the median portion of the transversalis would so far retract the anterior abdominal wall, as to bring it into contact with the lumbar vertebræ, were it not prevented, by the more anterior attachments of its upper and lower portions, and by the action of the more superficial abdominal muscles.

The lower fibres of this muscle, those attached to the iliac crest and ligament of Poupart, by their contraction simply tighten the line across the lower abdominal regions, and compress the intestines.

From this description, it is evident that our previous remark, as to the importance of the *transversalis*, was not an exaggerated one. By its contraction it 1st, assists powerfully, by the action of its upper fibres, in diminishing the capacity of the thorax; 2d, through the agency of its middle division, it contributes more than any other muscle toward the diminution of the abdominal cavity, and the compression of the abdominal viscera; 3d, through its lower portion, it acts in an analogous manner to the lower portion of the oblique muscles.

The next most important muscles in the expiratory group

are some of those situated in the lumbar and dorsal regions. Let us first consider those large muscular masses which lie in the spinal groove, and are called, collectively, the *erector spinæ*. The erector spinæ is easily devisible into an outer and inner portion (see Fig. 3). The outer portion, the *ilio-costalis*, is connected below, by means of the lumbar aponeurosis, to the iliac bone; above, to the angles of the six or seven lower ribs. The inner portion, the *longissimus dorsi*, is

Fig 8

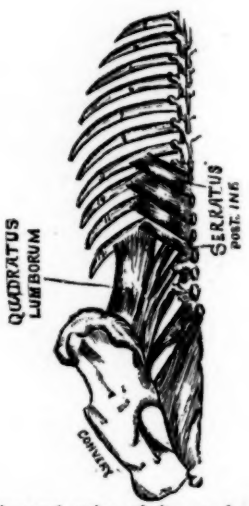
Diagram to show the division of the *erector* spinæ into two portions; an inner, the *longissimus dorsi*, only a part of which is shown; and an outer, the *sacro-lumbalis* or *ilio-costalis*. (*Original.*)

more complex in its arrangement, but the only part of it in which we are interested consists of a number of fleshy digitations, attached below, through the lumbar aponeurosis, to the posterior portion of the pelvis; and, above, to eight or ten ribs, half-way between their angles and the vertebral column. When the erector spinæ contracts, those portions of it to which I have called your attention, draw the ribs forcibly downward toward the pelvis, and the descent of the ribs lessens the transverse and antero-posterior

diameters of the thorax, while it tends at the same time, to shorten the perpendicular axis of the abdomen. The accessory muscles, which reinforce the *erector spinæ* above, act upon the upper ribs; but their strength is far inferior to that of the *ilio-costalis* and *longissimus dorsi.*

These are assisted by two other muscles of some power, viz., the *serratus posticus inferior*, and the *quadratus lumborum* (see Fig. 4). The former acts at very great advantage upon the lower ribs, but the importance of the latter is not so great.

Fig. 4



Diagram, showing the position and action of the *quadratus lumborum* and *serratus inferior.*

When these powerful muscles of expiration are spasmodically contracted, in the act of coughing, their first effect is to adduct and depress the ribs, and, by so doing, to diminish the size of the thorax, in all its diameters.

The adduction or drawing inward of the ribs shortens the lateral diameter. The depression of the ribs and sternum shortens the distance from the top of the sternum to the pubis; that is to say, it shortens the longitudinal axis of the general body cavity; but as the abdominal

walls only yield in the upward direction, and its contents are, practically, incompressible, its roof, the diaphragm, must ascend and incroach upon the thoracic cavity, from which enough air escapes, through the trachea, to compensate for the diminution in its size.

The second effect of the expiratory contraction is to lessen the circumference of the abdomen. This is accomplished through the agency of the abdominal muscles, as described above. As the circumference diminishes, one of three things must occur: either its contents must be diminished in volume, or some of them must escape, or else, as the circumference diminishes, the length of the cavity must increase. As the contents are, approximately, incompressible, and as the sphincter muscles, by their action, prevent the escape of anything from the hollow viscera, the decrease in the lateral and antero-posterior dimensions of the abdomen must be compensated for by an increase in the long diameter. But the lower portion of this cavity is bounded almost entirely by bony walls which cannot yield; its roof, the diaphragm, will therefore ascend, encroach upon the thorax, and greatly diminish its depth.

This slight study of the action of the muscles during forced expiration will make plain the effects of coughing, upon the lungs and other viscera. As has been already stated, in our definition of cough, the forcible expiration is preceded by a more or less deep inspiration, by which means a large quantity of air is inhaled, for use in expelling the offending substance from the air passages. The glottis is then partially closed by the adduction of the vocal cords, so as to narrow the route of exit and increase the friction of the expelled air upon the mucous membrane of the larynx, trachea, etc. Then comes the sudden and forcible contraction of the muscles of expiration. The lower ribs are drawn quickly downward

and inward, lessening the capacity of the lower thorax. The pressure upon the abdominal viscera drives them upward against the diaphragm (which is relaxed during expiration), and pushes the floor of the thorax upward against the bases of the lungs. The lower lobes are then suddenly and violently pressed upon from all sides, and their contents driven in the direction of least resistance, upward toward the trachea; but, as the glottis is not widely open, the air cannot escape with sufficient rapidity to immediately relieve the great pressure, and some of it will consequently seek another avenue of escape, and, following the lines of least resistance, will pass into the upper and anterior parts of the lungs.

We must bear in mind that the apices are very little subject to the expiratory force. They rise above the first rib, through the superior opening of the thorax, and ascend, to the height of an inch or more, above the clavicle. Here, they are covered merely by the pleura and deep fascia of the neck, with the *scalenus* and *omo-hyoid* muscles in contact. The air is expelled from them, only by virtue of their own elasticity and, perhaps, through the attachment of the pleura to the ribs.

The anterior borders of the lungs lie underneath the sternum, in a part of the chest which changes its shape but little during inspiration and expiration, and these borders, also, expel the tidal air mainly through their own elastic contraction.

When, therefore, the lower lobes are quickly and powerfully compressed, part of the rapidly-displaced air, not able to escape at once through the glottis, passes into the apices and anterior borders of the lungs, *reversing the current* of air in the bronchial tubes leading to these districts, and greatly dilating the vesicles.

This forcible distention of the apices may frequently be observed in patients suffering from violent spasmodic

cough, as in bronchitis, the early stages of phthisis, and pertussis. During the paroxysms, the supra-clavicular spaces are seen to bulge, sometimes to a very remarkable degree, partly, it is true, from swelling of the large veins in that region, but partly, also, from distention of the apices. The same thing can frequently be seen in the upper intercostal spaces near the sternum.

In cases of acute bronchitis, we find, as a result of the increased expiratory efforts, both in breathing and coughing, a temporary distention of the alveoli of the upper and anterior portions of the lungs, manifested by prominence and increased resonance upon percussion, and a temporary, functional emphysema, which will subside as the attack passes off.

In asthmatic attacks, the temporary swelling or emphysema, which results from the difficulty in expiration, begins in the upper portion of the chest, and may, if the case is not severe, be limited to that region. The permanent emphysema of old asthmatics affects the upper portion of the chest, which is prominent and so rounded out as to give to the thorax something of a barrel shape.

The emphysema of those who play upon wind instruments is also produced by the powerful expiratory efforts, distending the upper and anterior parts of the lungs. But these evil effects of the unequal distribution of pressure during forced expiration are of little import, compared with those seen in the phthisical diseases. In these unfortunate cases, the morbid processes begin in the vesicular structure and small bronchi of the apices. The irritation of the terminal filaments of the pneumogastric sets up a frequent and spasmodic cough, but this cough, instead of aiding the sufferer by expelling the necrotic cells and other débris, simply, by reversing the current of air in the bronchi of the apex, presses them in the tighter, and aggravates the disease. This is, to my

mind, a very important factor in the retention and caseation of the catarrhal products in a phthisical apex. Undoubtedly, the best way to relieve these patients is to give them something to lessen the severity of the cough, and, at the same time, by removal to a rarefied air or judicious exercise, to increase the inspiratory expansion of the lungs.

When an emphysematous dilatation is already present, the sudden distention of the upper lobes, during a violent paroxysm of coughing, may lead to rupture of the lung and extravasation of air into the subpleural connective tissue.

This extravasated air will find its way to the mediastinum, or to the root of the neck, and finally collect beneath the skin, where it will give rise to subcutaneous emphysema. I have had several opportunities to observe this, both ante- and post-mortem. A very striking example occurred in the practice of my friend Dr. Avery Segur:

The patient, a young woman, suffered from acute tuberculosis, and, during a fit of coughing, the subcutaneous tissue of the neck and upper portion of the chest, upon one side, suddenly became emphysematous. At the autopsy, which I made for the doctor, it was impossible to find any perforation of the lung or bronchial tubes, but, as the apex was markedly emphysematous, we could only conclude that the attenuated wall of some vesicle had been ruptured by the violence of the cough. To properly examine for such a lesion, the lung should be exposed with great care, and then inflated from the trachea, before it is removed from the body. If the point of rupture is not discernible, water, or some more viscid fluid may be poured upon the surface, so that the escaping air will produce bubbles at the point of rupture. But it is not

always possible, even with the greatest care, to find the laceration.

Besides its effects upon the lungs, the act of coughing produces a very considerable disturbance in the circulatory apparatus, mainly upon the venous side. In ordinary breathing, the pressure inside the thorax becomes slightly positive during the expiratory phase; but, in forced expiration, particularly when it is rapid in its occurrence, the pressure rises to a high degree.

This not only entirely stops the current of blood in the large veins of the chest, neck, and abdomen, but, no doubt, even reverses it, so that the blood already in the right auricle and venæ cavæ is forced backward upon that already advancing toward the heart, and great distention of the veins is the result. Owing to the large area of the veins, this increased pressure is not felt as it would be in the arteries; but, in the interior of the skull, the venous hyperæmia may do considerable damage. Indeed, in children affected with whooping cough, the prolonged and frequently repeated paroxysms of cough give rise to so much disturbance of the intracranial circulation, as to lead sometimes to fatal congestions. Hence the advisability of doing something to modify the severity of the paroxysms in this disease, even if we cannot arrest its progress.

The abdominal circulation suffers less, because the strong contraction of the abdominal muscles squeezes the blood out of the veins. In the pelvis, however, where there is yielding in the downward direction, there is a tendency for the blood to be forced toward the outlet, and the inferior hemorrhoidal veins, as well as those of the uterus, vagina, and bladder, are sometimes so turgid that slight ruptures and hemorrhages occur.

This is particularly the case with the uterus. I have occasionally seen cases in which a bloody serum would be

discharged from the vagina during the paroxysms of cough.

The pulmonary circulation and left heart are not so notably affected. There is, however, a temporary accumulation of blood in the capillaries, and, at the surface of the bronchial mucous membrane, ruptures may occur. In this way, are produced those slight hemorrhages which simply streak the sputa, in acute bronchitis. If the structure of the lung be softened by inflammatory, or necrotic processes, large vessels may be torn across, and copious hemoptysis ensue.

Cough may be induced by anything which irritates any branch of the vagus or its closely associated nerves. Beginning above, at the auricular branch, which is distributed to the external auditory canal, I must tell you that irritation of this canal is frequently the cause of a dry spasmodic cough, whose origin is not always easily ascertained.

Foreign bodies, such as insects, and impacted cerumen, are the most common irritants. When cough arises in this way, it is apt to be preceded by a tickling sensation in the depths of the ear. It may be produced, experimentally, by scraping the meatus with a pin head, or a match. The introduction of a probe often provokes a cough.

Irritation of the tympanum and Eustachian tube may also give rise to cough, though the afferent impression is transmitted through the branches of the trigeminus, or glosso-pharyngens.

In the posterior regions of the nasal chambers, there is an area, excitation of which, we are told by the laryngologists, will excite a spasmodic cough. According to Dr. Jno. N. McKenzie, of Baltimore, who has investigated the subject with some care,[1] the most sensitive parts are the

[1] American Journal of the Medical Sciences, July, 1883, p. 106. Among my many obligations to my friend Dr. Thos. R. French, I am indebted to him for calling my attention to this very interestng subject.

posterior half of the turbinated bodies, and the septum directly opposite. Touching the mucous membrane in this region will, even in healthy persons, excite a sudden cough. The sensory nerves are the nasal branch of the fifth, and the descending branches from Meckel's ganglion.

Some cases of very obstinate chronic cough have only been cured after the discovery of disease (hypertrophic catarrh) in this portion of the nasal cavity, and its removal by appropriate means.

It will be remembered that the part of the nasal cham bers alluded to, is very sensitive in other ways. The frequent site of polypi, the irritation from them has long been known to be an exciting cause of spasmodic asthma. Catarrh of the posterior nares propagates itself readily into the pharynx and larynx, and, according to Dr. McKenzie, excitation of the sensory nerves in the posterior nares produces, in some people at least, an immediate reflex blush in the superior chamber of the larynx.

To what extent the peculiar erectile structure of the soft parts covering the turbinated bones is related to this sensitiveness, and its reflex action upon the lower respiratory apparatus, is one of the physiological problems that we have yet to solve; but the association is interesting, and of practical importance.

Irritation of the pharynx, either inflammatory or otherwise, may excite a cough; though the tendency is not well marked, until we approach the base of the tongue and larynx. Whether the reflex action is brought about through the agency of those fibres of the pneumogastric, which enter into the formation of the pharyngeal plexus, or through the glosso-pharyngeus, it would be difficult to say.

Irritation of the superior compartment of the larynx, except posteriorly, in the neighborhood of the arytenoid cartilages, is not followed by as severe paroxysms of cough

as might be expected. The most important result of the introduction of any foreign body, particularly in the posterior region, is a spasm of the glottis. But, should any extraneous matters find their way through the chink of the glottis, into the trachea below, the most violent spasmodic cough is the result. Laryngitis is not accompanied by a violent cough, unless the inflammatory action descends into the trachea. In ordinary catarrhal laryngitis, there is usually very little cough, even when the hoarseness is so great as to amount to aphonia. In the croupous and diphtheritic laryngitis of children, the cough is, generally a symptom of minor importance, and has not the violent character observed in cases of inflammation of the trachea and upper bronchi.

Chronic laryngitis is accompanied by very little cough. When present it is caused by the accumulation of secretion, mucus or muco-pus, which hangs upon the vocal cords, or drops over into the lower larynx and trachea. In this affection, a constant clearing of the throat is a much more prominent symptom than cough, and much more significant of the nature of the disease. Even in tubercular or phthisical laryngitis, the cough is not at all in proportion to the extent of the laryngeal disease, and is, apparently, mainly induced by the bronchial and pulmonary irritation. I have not observed that phthisical patients who have extensive disease in the larynx cough more than those who do not; though the laryngeal patients, of course, always get more opiates than others.

Though the final distribution of the pneumogastric nerves in the pulmonary parenchyma has not as yet been demonstrated, evidence of its penetration to the vesicular structure is afforded by the cough which almost always accompanies disease of the proper tissue of the lungs. This cause, however, like irritations of the larynx, is not as active in producing cough as are similar conditions in

the trachea and upper bronchi. The cough of pneumonia is not as violent as that of bronchitis; neither is the cough at all violent in the first stages of most cases of phthisis, when the disease is limited to certain portions of the parenchyma. But, when the malady is more advanced, the destruction considerable, and an active bronchitis has been set up by the presence of decomposing matters in the tubes, the cough becomes violent, and a source of great distress to the patient.

The pneumogastric, below the diaphragm, is still capable of conveying impressions to the medulla, which, on arriving there, may excite the act of coughing. There are some cases of gastric catarrh, some, it may be, of atonic dyspepsia, in which the irritation by undigested food causes a cough, usually of a mild, hacking character.

Intestinal worms may also be the exciting cause of a cough. But, I think, we should hesitate before committing ourselves to the theory that a given patient has a "stomach cough." Though such a thing does undoubtedly occur, I believe it to be somewhat rare, and that, in many cases in which this diagnosis is made, a more thorough investigation would lead to the discovery of some more direct cause. It should not be forgotten that many dyspeptics suffer from a pharyngeal, laryngeal, or bronchial catarrh, which results from the circulation of abnormal substances in the blood; and the presence of this catarrh may account for the cough. Probably, also, some cases of nasal cough, such as I have described above, have been diagnosticated as stomach coughs, because the real cause was not discovered. The term should be used with caution, remembering that there are, in medicine, certain expressions, such as "stomach cough," congestion of the lungs, hysteria, gastric fever, typho-malarial fever, which, while they have a legitimate meaning, are frequently employed to cover the ignorance of the diagnostician.

In addition to all these sources of reflex cough, there are others of less importance, but the only ones to which I shall allude are the uterine and ovarian plexuses. The association of the uterine and ovarian nerves with the pneumogastric, while not demonstrable anatomically, is often manifested physiologically. The vomiting of pregnancy, some of the phenomena observed at the grand climateric, and the globus hystericus, are instances which serve to show this relation. Cough is another, and in some cases of uterine and ovarian disease, a reflex cough is observed; it should, however, be borne in mind that here, as in the cough accompanying dyspepsia, the relation may be only apparent, and not real.

Before closing, I should like to direct your attention for a few moments to some of the prominent diseases of the respiratory organs, and the varieties of cough which accompany them.

Laryngitis has been sufficiently considered already.

Acute bronchitis is an acute swelling of the mucous membrane of the trachea and bronchi, of variable extent and intensity, with dilatation of blood-vessels, increased succulence of the tissues, and rapid proliferation and exfoliation of epithelium. The irritation suffered by the nerves of the bronchi, in this disease, is extreme; and, when the exfoliation is pretty active, so as to leave the deeper layers of the mucosa bare, the tenderness is very great. Besides this, the swelling lessens the elasticity of the bronchial walls, so that they can neither elongate nor dilate as readily as under normal circumstances. The cough is spasmodic and violent, the sudden compression of the thorax so considerable that the venous blood is forced back in the jugulars, and the head congested. The increased pressure, and friction of air and secretion over the inflamed surface, cause pain and soreness, which is aggravated by the loss of elasticity in the tubes. For, normally, the tra-

chea and primary bronchi elongate and contract with the respiratory movements, and the changes in posture; but now, they can neither change their length, in accordance with the rapid thoracic movements, nor can they dilate, under the increased pressure produced by violent expiratory efforts, as they would were the mucous membrane not swollen.

When free secretion occurs, and the swelling of the tissues subsides, the irritation of the nerve filaments is diminished, and the tenderness on friction or pressure decreases. The mucus, covering the surface, diminishes both friction and rapid evaporation. In the second stage of bronchitis, therefore, the cough is lessened in frequency and severity, is not so painful as at first, and is accompanied by more copious expectoration. Owing to the violence of the cough, as well as to the expiratory obstruction, the upper lobes of the lungs become temporarily emphysematous, as has been previously explained.

Chronic bronchitis does not produce as much superficial swelling as is found in the acute forms, though the walls of the tubes are more permanently thickened. Proliferation and exfoliation of epithelium are more rapid than in health. The bronchial walls become fibrous and lose their elasticity.

Owing either to the slighter degree of irritation of the terminal nerve filaments, or, to the fact that these filaments become accustomed to a morbid condition which lasts for so long a time, the cough of chronic bronchitis is not usually as severe as in the acute form, though some subjects of this disease have very violent paroxysms at times. The constant repetition of the cough, however, for a long period of time, finally results, not only in emphysematous dilatation of the air-vesicles, but also of the bronchi themselves, deprived, as the latter are, of their elasticity and muscular contractility, through the changes in their walls. This

dilated and paretic condition of the bronchi permits the accumulation of mucus and muco-pus during the night. This accumulation finally obstructs respiration, or irritates the bronchial nerves sufficiently to rouse the patient, toward morning, when he must cough till the offending substances are removed.

In pneumonia, without pleurisy or bronchitis, cough is not at all a prominent symptom. When present, particularly in the first two stages, it is a small, hacking cough, frequently so slight as to attract very little attention. Often, there is none at all. This is particularly the case, in the asthenic pneumonias; not only the special disease of old age, but when the disease assumes its adynamic form in younger subjects.

This was illustrated in a case which I recently saw in New York with my friend Dr. W. W. Reese. The patient, a lady about forty years old, of fragile body and delicate constitution, commenced to ail at about Christmas time, but, with the exception of a slight fever, some dyspnœa, and a little pain in the chest, there was no indication of pulmonary disease. After a week or two, she took to her bed, where she had remained for about a month at the time of our visit. During this period, she had had fever of the hectic type, with night-sweats, rapid pulse, anorexia, and great prostration; but, at no time, had there been any cough, with the exception of an occasional clearing of the throat, to remove some catarrhal mucus. The right lung, six weeks after the beginning of her illness, was solid from base to apex, as indicated by dulness upon percussion, and bronchial respiration with bronchophony. Since then, the lung has been gradually clearing up.

Cases of this kind are not infrequent in practice. When resolution begins, or if the lung should undergo a necrotic process, with excavation, the bronchitis accompanying it may inaugurate a cough.

Such was the course of events in a case which I once had the opportunity to see with my friend, Dr. A. S. Clark, of this city. The pneumonia, or rather pleuro-pneumonia, followed a post-partum suppurative pelvic cellulitis. Though the entire left lung was solidified, and fluid was present in the pleural cavity, there was absolutely no cough, until at the end of six or seven weeks the lung began to undergo a change similar, as far as could be judged, to purulent infiltration; when cough and the expectoration of muco-purulent sputa began. Probably every experienced practitioner could cite similar instances. They are not at all uncommon.

If a pneumonia is accompanied by bronchitis, cough becomes a symptom of some moment, mainly on account of the distress which it occasions. If pleurisy also be present, then the cough assumes a peculiar character, known as the "suppressed cough." The inflamed pleura is excessively tender, so that the active movement involved in an energetic cough would occasion the most excruciating pain. The patient, therefore, exerts himself to keep the cough back, and the result of his strenuous efforts is, that when it occurs it is low and short, accompanied by a very evident attempt at its suppression. When there is no pleurisy, the cough may still have the suppressed character, but it is not so well marked.

Pleurisy, of itself, is not apt to excite much cough; but the acute forms are almost always accompanied by bronchitis, to which the cough is mainly due. The cough of acute pleurisy is, *par excellence*, the suppressed cough. The reason for it has already been sufficiently indicated, in speaking of pneumonia. Many cases of subacute and latent pleurisy occur without the presence of any cough whatever. A patient recently admitted to the wards of St. Mary's Hospital had, as far as could be judged, carried a collection of serous fluid in his right pleural cavity for

three months, without ever suspecting its presence. Though he had some cough, he had not thought much of it, as he had been troubled with winter cough for twelve years. The most marked symptom was dyspnœa upon exertion, a symptom which we should always take great pains to find the cause of in any patient whom we find to be afflicted with it. In this climate, latent pleurisies, without cough, are very common.

The cough of pulmonary consumption is, as has already been said, slight in the early stages. As soon as bronchitis occurs, however, it becomes more violent, and is a great source of suffering to the patient, besides directly interfering with the nutrition of the lung. I have already explained how it tends to pack the foul products of caseous degeneration into the alveoli and air-passages of the lung, and have referred to the necessity of controlling it, on this account. But it also has a deleterious effect upon the bronchial tubes and larynx; by the constant irritation from increased pressure and friction it deprives the patient of rest; and by the constant churning action of the abdominal muscles, provokes vomiting. These are all additional reasons for endeavoring to control it. I would not recommend you to give cough mixtures throughout the twenty-four hours. The best plan, in the first stages, is to give a dose of the anodyne at bed-time, with permission to repeat it once or twice during the night, if necessary in order to secure rest. If the night is comfortable, the day will be passed very well, and the stomach should not be embarrassed by cough mixtures during the hours when its digestive function is in demand. For the stomach's sake, it is better not to use syrups in cough mixtures intended for phthisical patients. The only two syrups that seem to be well borne are, the wild cherry and tolu. The first of these has a pleasant sedative effect of its own; it has the very valuable property of obviating the nauseating effect

of morphia when they are administered together. But such syrups as those of senega, ipecacuanha, and the like, are out of place with consumptives. In the third stage of phthisis, and as the end approaches, the cough is very frequent and annoying. To control it to any perceptible extent, without otherwise producing discomfort, will frequently tax your therapeutical skill to the utmost. The bronchitis gives rise to large quantities of muco-purulent expectoration, which must be gotten rid of, so that it is not wise to give too large doses of opium. A very interesting therapeutical observation in this disease is, that morphia often seems to loosen the cough. The explanation of it is, that the cough, owing to the irritated condition of the tubes, is in excess of what is necessary to expel the offending matter, consequently, after the sputa are all coughed out, the subsequent paroxysms are ineffectual, serving only to increase the pain and discomfort. The opiate, by lessening the frequency of the explosions, gives time for the accumulation of the secretion, and the cough, when it occurs, is accompanied by the expectoration of sputa. The patient's feeling is that the opium has softened the cough. During the last days of the life of a consumptive, the cough almost or quite ceases. This is probably because the irritability of the nervous mechanism has been exhausted, and the chemistry of nutrition is at so low an ebb that recuperation can no longer take place. The secretion accumulates in the trachea and bronchi, causing loud tracheal râles which can be heard by one sitting at the bedside.

Another respiratory disease, which should not be omitted from a discussion of the phenomena of cough, is pertussis. Without attempting to say anything in regard to the pathology of this affection, I will at once consider the characteristics of the cough. This is essentially paroxysmal, and consists of a great number of rapid and forcible

expiratory efforts, following each other as closely as do the expirations in laughing. When the contraction of the thorax has reached its maximum, it is succeeded by a forcible, deep inspiration, during which the adductors of the vocal cords are spasmodically contracted, producing a loud crowing sound as the air is drawn through the narrow chink.

During the expiratory phase of the cough, the passage of blood into the right heart is entirely suspended, and its accumulation in the veins of the head and neck is so great as to give the appearance of great turgidity, and even, at times, to cause a rupture of some of the capillaries in the nasal mucous membrane, conjunctiva, or the auditory meatus. Hæmoptysis has sometimes been produced. As already mentioned, the frequent and prolonged paroxysms may interfere with the cerebral circulation to such an extent that convulsions are produced. The effect of this high pressure upon the lungs is to produce temporary emphysema, as above described.

The damage to the vesicular structure may be so great that permanent emphysema follows, and the patient remains short-breathed and asthmatic, after the original disease has entirely disappeared. It has sometimes happened that, in a violent fit of coughing, some distended vesicle has ruptured, with the production of subcutaneous emphysema.

In addition to the diseases of the respiratory organs, there are some other morbid conditions in which cough is produced, by direct implication of pneumogastric nerves.

The only one to which I shall allude is the presence of tumors which exert pressure or traction upon the nerve. The most interesting and common of these is aneurism of the arch of the aorta, or of its primary branches. One of the first symptoms in many cases of thoracic aneurism is a violent spasmodic cough. It usually occurs at irregular

intervals, and is brought on by any exertion which would increase the functional activity of the circulatory apparatus, or by some particular posture which increases the pressure in a given direction. A cough of this character, occurring in the case of an otherwise robust person, especially an adult male, with no apparent pulmonary disease to account for it, should always excite suspicion, and lead to a careful investigation of the circulatory apparatus. It is usually far more violent and annoying than any other cough which arises from irritation outside the respiratory organs.

When the aneurism involves the arch in such a manner as to compress the recurrent laryngeal nerve, partial or complete loss of voice may result, the nature of which can be readily determined by observing, with the laryngoscope, the immobility of a vocal cord from paresis of the muscles which normally move it.

There are many other considerations that might have been entered into, in a discussion of the phenomena of cough, but the subject is so extensive, that I have simply selected those points which seemed to have the most interest for the general practitioner, and to be of the greatest importance in the examination of patients.

THE INSANE HOSPITAL AS A THERAPEUTIC IMPLEMENT.

BY

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THE HOSPITAL ITSELF.

IT may be laid down as a generally accepted proposition that an institution for the insane is a hospital, and not a mere place of custody. The latter function was for a long time looked upon as the chief function of institutions for the insane, and, as a consequence, structures modelled on prisons have been erected at a large cost, which are worse than useless for the purpose of hospitals for the insane. Since an institution for the insane is a hospital, and treatment is the object of a hospital, everything in its management is only a means toward that end. Into the treatment of both the sane and insane enters not only the question of medicines and diet, but the influence of mental impressions made. As Bucknill and Tuke[1] have said: "Dyspepsia caused by anxiety is cured by prosperity and content; the dysentery of armies waits upon the depression of defeat, and is cured by the breath of victory." As mental impressions are derived from one's surroundings, it follows that everything connected with a hospital for the insane should be made subservient to the one purpose of treating the inmates, since it has been found by extensive experience that treatment of the insane in specially devised

[1] Psychological Medicine.

hospitals yields the best results. The patient, who at home is the centre of well-meant but illy directed sympathy and in consequence the monarch of all he surveys, becomes, on entering a hospital for the insane, one of the members of a large community whose surroundings demonstrate to them that they are regarded as sick people, whether they so regard themselves or not. The mind of the insane is so constituted that it can originate nothing but what is tainted by disease. Healthy ideas may be introduced from without, which are stronger in their influence than those originating in the mind of the patient. To introduce healthy ideas, the manner adopted must be such as will not arouse opposition; the healthy ideas must be insinuated into the mind. If the idea be insinuated into the patient's minds by his surroundings that he is regarded as a person to be treated in a hospital for his sickness—insanity—this idea tends to develop self-control, and the development of self-control tends to cure or alleviate insanity.

Clouston[1] says: "The immediate effect of coming into the asylum differs greatly in different patients. Some are so absorbed in their morbid trains of thought, or so absolutely delirious, that it has no apparent effect at all. Their minds are in such a condition that nothing without them makes any impression on them, their power of attention having disappeared. Those do not form the majority, however. Others are in a morbidly elated condition and take a rose-colored view of the situation. One such case, after looking about and making some approving remarks as to the place, said it would make him an admirable palace and offered to buy it of me for half a million. On my saying that I then should have nothing to do, he offered to continue me as physician at a salary of £10,000 a year, providing me with a uniform made chiefly of gold

[1] Report for 1881.

lace. One poor old woman had lived alone, and becoming insane partly because she lived alone, had to be sent here on account of her delusions that all her neighbors were in a conspiracy against her, and night and day were annoying her by shouting and whistling and calling bad names down the chimney and in through the key-hole, she naturally resenting this and 'giving them a bit of her mind' in reference to such 'persecution.' When she arrived and was sent to the admission ward, there happened to be a good deal of noise at the time made by several excited patients. It was apologetically remarked to her that it was noisy just then, but it was not always so. She replied; 'Oh, this is a paradise compared with home; my neighbors make ten times this noise.' If one wants to see how much more intense the impression made on human nature by imaginary things than by real ones may be, one has merely to go into a lunatic asylum or a nursery. Those who have to portray strong emotions, such as frenzied grief, or blank despair, or horrible remorse, have often nowadays to go into an asylum for their models, where the causes of these emotions are entirely imaginary, but yet the feelings themselves and their outward expressions are seen in the greatest possible intensity. I have a patient now who believes she has done fearful crimes and is a demon, and who portrays, in expression and action, so vividly the emotions of grief and remorse that any actress who could imitate her would certainly make a better impersonation of Lady Macbeth than any that I have ever seen or heard of. Other patients on admission realize their position only too keenly and suffer from the popular misapprehension of what an asylum is. They fear the association with insane persons far more than there is any occasion for, and they share the popular belief that such association will necessarily be injurious to them. To such it is especially necessary to make first impressions

as pleasant as possible, so as to dispel their prejudices and gain their confidence. It is wonderful how a bright, pleasant-looking ward, the absence of any unpleasant suggestions of restraint, a few reassuring kindly words from an open-mannered, honest-looking attendant, and a chat with the doctor while he is making his medical examination and writing down his report beside the patient, will calm such a person and dispel imaginary fears. As a matter of fact and experience, the placing of a person afflicted in mind into an asylum tends to make him exercise more self-control than he has done at home in most cases. In the cases of those whose thoughts have been centred on themselves, and perhaps their imaginary ailments, it has a wholesome influence, through the distraction of their attention from such things to outside matters. A man whose mind is affected is usually the worst company for himself, and his own thoughts are least helpful to him."

Dr. Godding[1] has fittingly said in this same connection: "The commitment of an insane man to a hospital is legal —it not only conveys the right and the power, but it makes it our duty to hold him. Equally is it his right to know the facts, so far as he is capable of comprehending them. It would be pitiable if he could only attain that knowledge through a tissue of lies. Do I mean that he should be made acquainted with all the details of his case, including prognosis? Not at all. No more than any other sick man. Dr. Cowles, of Somerville, Mass., in his last report, has admirably condensed into a single sentence all that it is necessary to say to the insane on this subject: 'You are sick; you may get well.' The insane have a right to expect, and should find, the hospital a home. What, this man, with whom, for months, there has been no possibility of living—who has made his own home a hell—will he settle down comfortably and feel at home in a hospital? Prob-

[1] American Psychological Journal, i., 1883.

ably not; his right amounts only to this that his surroundings there shall be such that, were he capable of appreciating them, they would seem home-like. There are some people—they call them sane, too—in purple and fine linen, who have palatial advertisements of their wealth, which they mistake for homes, but which, so far as they make any home atmosphere about them, might as well be wigwams. The contented mind—the home that is within—you cannot make good the want of that by any surroundings. Nevertheless, the right of asylum, it is the right of refuge from the world and from one's self; it entitles to a home, with all which that word implies. If it be said that the primary object of a hospital is to bring about a cure, not to make a home, I admit it; but I deny that the two are incompatible with each other; indeed, the content which the home-feeling gives is most favorable to recovery; the moral treatment, so called, is in a majority of cases more efficacious than medicine. But what would be home comfort for one would fall far short of that for another; with some points common to all, very diverse apartments must be provided, if we are to have our hospitals in any considerable degree approximate to such ideal asylum; something more than a stereotyped plan of unchanging wards would seem to be needed in shaping this house of many homes. But while we do well to place our hospitals in the midst of pleasant grounds, and keep the music of birds in their woods, and pour all the sunshine that we can into their picture-hung wards, neither the insane man nor his friends have any right to claim that he comes as a guest to a hotel, simply to find a quiet residence in the country. If that is what is sought, I would recommend the Ocean House, at Newport, or a farm house among the hills, as offering far superior inducements to summer boarders. No; your dentist's ante-room is full of vases and pictures and pleasant things, but you go there not to

study art, but to be relieved of a villanous tooth. So with the insane man; he knows, or his friends know that he is not in search of a watering-place, for he cannot be accommodated at their hotels, and as for a house in the country, it would not hold him. He goes to the hospital because he is insane, and this is the one central, important fact to which all question of mere surroundings is but secondary."

There are met with every day patients treated at home and in a hospital for the insane with exactly the same medicines. Those treated at home very often die or become permanently insane; the others as frequently recover. I am aware that Bucknill[1] says: "But it is not merely the happy change which takes place in confirmed lunatics when they are judiciously removed from the dreary detention of the asylum into domestic life; it is the efficiency of the domestic treatment of lunacy during the whole course of the disease which constitutes its greatest value, and of this the author's fullest and latest experience has convinced him that the curative influences of asylums have been vastly overrated, and that those of isolated treatment in domestic care have been greatly undervalued. It has long been the accepted doctrine that insanity can only be treated curatively in asylums. But it must not be forgotten that most of the works on the treatment of insanity have been written by medical men connected with asylums, who, without insincerity, might express opinions founded upon their own limited knowledge. A wider knowledge of insanity as it occurs among the upper and middle classes would have taught them that a very considerable number of cases of actual insanity run a short course and recover in domestic life with no great amount of treatment, and that not perhaps of a very scientific kind. As it is, the family doctor often treats and cures a case of lunacy

[1] The Care of the Insane.

almost without knowing it. Without paying that attention to the mental condition which he ought to do, he treats the failure of bodily health upon which it depends, and the patient frequently recovers in mind and body. In other cases, which are destined not to be transitory, the family doctor, of necessity, has to treat, and to treat at home, the disease in its most important phase—that of initiation and incubation. How little do the physicians of asylums know of the earliest stages of mental disease; and yet it is frequently in those stages alone that the disease is curable. But it is in these stages that the general physician or the family doctor does treat the developing disease—treats it at home and cures it." I am aware also that Dr. Lockhart Robertson[1] has spoken, under the pressure of a parliamentary investigation, as follows: "Has the opinion you have formed that it is desirable to remove as much as possible patients from asylums been based upon the knowledge you have acquired since your appointment as a Lord Chancellor's Visitor?—Most wonderfully. I could never have believed that patients who were such confirmed lunatics could be treated in private families in the way that chancery lunatics are, if I had not personally watched their cases." "'Is your experience of private asylums corroborated by your experience of public asylums? Do you hold the same opinion with regard to them as to private patients?—I do; I think the patients are happier and better out of them, if they can be removed out. Happier?—Certainly happier. Do you mean better behaved? Happier in the enjoyment of such pleasure and joy in life as is left to them.'" I am aware that Blandford[2] has said: "There are patients with ample means who make the fortunes of asylum proprietors, whose lives would be infinitely happier, did they live beyond

[1] Cited by Bucknill, op. cit.
[2] Insanity and its Treatment.

asylum walls. How are you to know if a patient is capable of living beyond the walls of an asylum? The answer is simple: 'Give him a trial.' Many unpromising cases I have known to benefit so much by the change that they would scarcely have been recognized. As the last generation did away with the fetters and mechanical restraints used in asylums, so let the present release from the restraints of an asylum all those capable of enjoying a larger amount of liberty and a freer atmosphere than that in which they now fret and chafe." I am aware that Maudsley[1] has said, referring to the objection that the lunatic might be better treated there than in a private residence: "The quarter from which this objection is urged taints it with suspicion; I never heard it put forward but by those who are interested in the continuance of the present state of things—those who make it, appear to fail entirely to appreciate the strength of the passion for liberty which there is in the human breast; and as I feel most earnestly that I should infinitely prefer a garret or a cellar for lodgings, with bread and water only for food, than to be clothed in purple and fine linen, and to fare sumptously every day as a prisoner. I can well believe that all the comforts which the insane person has in his captivity are a miserable compensation for his entire loss of liberty; that they are petty things which weigh not at all against the mighty suffering of a lifelong imprisonment. I would put it to those who lay stress on the comforts of asylums whether they sufficiently consider the discomforts of them, apart from the imprisonment which they are by the nature of the case. Is it not a common thing to hear from an insane person bitter complaints of the associations which he has in the asylum, and of the scenes of which he is an unwilling witness—scenes which cannot fail to occur, notwithstanding the best classifica-

[1] Pathology of the Mind.

tion, when all sorts and conditions of madness are congregated together? What can be conceived more affecting to a man who has any intelligence and sensibility left than the vulgar tyranny of an ignorant attendant—a tyranny which the best management cannot altogether prevent in a large asylum? And I might go on to enumerate many more of the unpreventable miseries of life in an asylum, which, when superintendent of one, forced themselves painfully upon my attention and often made me sick at heart." I am fully aware of all this, but would ask the reflecting alienist if the insane do not fret against being interfered with in any of their projects, and do not regard such interference as interference with liberty; and if the imprisonment in the asylum, as interference with liberty, is unjustifiable, the interference with the lunatic's projects is equally unjustifiable. Yet, if these be not interfered with, how shall society be protected or the patient's insanity cured? Is a patient at large under care of an attendant less subject to that attendant's caprices than if he were in the hospital? Maudsley says those who praise asylum treatment have interested motives. Has he or Bucknill no interested motives in toadying to the general practitioner? In America there have been men who are devoted to the best interests of the insane; of these, there is at least one man denounced by superintendents who believe in an oligarchy of medical politicians, Dr. Spitzka, who is a general practitioner whose studies have taken a special direction, who cannot be accused of asylum prejudice, since he has studied the subject from both sides the asylum gate. He,[1] an impartial authority of repute, says: "A hospital sojourn has, in the vast majority of cases, a good effect on the insane. Curable cases are never injured in their prospects in a medically well-managed institution, and incurable cases should be there

[1] Insanity; its Classification, Diagnosis, and Treatment.

for practical reasons, and are better off in than out of an asylum. The advantages of hospital treatment are these: refusal of food and medicines, great obstacles to the treatment of the insane outside of hospitals, are best dealt with by a skilful corps of physicians and attendants always on the spot, with the requisite appliances at their disposal. The necessary supervision of the insane at all hours can be carried on at least expense and greatest thoroughness in the hospital ward. The excessive use of narcotics, and restraint necessary for preventing scandal, noise, and destructiveness at home are not required in the hospital. The sojourn of a patient in a hospital for the insane, and the restraint of its walls is a constant reminder that he is regarded as insane. It is, in many cases, a far stronger incentive to a kind of reflection which leads to the correction of delusions than any drug."

It is clear then that the greatest effect of hospital treatment is due to the impression made on the mind of the insane patient. If the hospital for the insane be built like a prison; if it be conducted more on the idea of saving money out of the patients than of saving money through curing them, it will damage its patients as much as it would otherwise benefit them. When hospitals for the insane are so built as to impress the patient with the belief that he is entering a prison, such an impression has a very bad effect on him, which tends to make his disease resist treatment otherwise beneficial. If, however, the hospital be built in such a manner as makes the first impression agreeable, the patient is, despite himself, favorably impressed, and this favorable impression is strengthened or diminished as the interior structure or management most resemble those of a hospital or a prison. In the hospitals of the eighteenth century, which were constructed on a prison plan, the insane displayed a fury which would be scarcely credible, were it not that similar pictures are presented

from almshouses where the insane, being few in number are shackled and confined in dungeons. Dr. A. Bennett,[1] of the Norristown, Pennsylvania, Hospital for the Insane, has had under observation a patient who had been chained in a dungeon, and her food thrust into her den through an opening in the wall, which she must eat as best she could with her hands tied. This patient, a tall, powerful German woman, came to the Norristown Hospital with a horrible reputation for ferocity. In a very short time she became tractable and quiet, and presented an appearance calculated to attract rather than repel. Being asked, why she was so wild in the almshouse and so quiet in the hospital, she replied: "Because they locked me up like a beast. How would you like to be locked up like a beast?" From this case, which could be duplicated thousands of times in the history of the English, French, Italian, German, and other European insane in the eighteenth century, it can readily be seen that the impression made on the patient by the external appearance and internal appointments of a hospital is a very important element in the treatment. It may, therefore, be accepted as a fact settled by years of experience in England, Ireland, Scotland, Germany, France, Italy, Holland, and the Scandinavian countries, that the external appearance of a hospital should be the most cheerful and alluring possible.

The cell-like construction of many asylums was due to the fact that they were modelled on old monasteries. These cells were intended to secure for pious monks the very thing it is desirable for the insane to avoid, the opportunity for unwatched solitude. The insane patient, shut up by himself alone or with a single companion, finds his disordered fancies exercising complete sway over his mind, while the presence of a single companion tends to aggravate these and excite him to violence. The insane

[1] Journal of the Medico-Legal Society, July, 1883.

patient under such circumstances readily conceives that he is looked upon as a criminal, and this causes either deep dejection or great violence, as the patient is inclined to be sad or furious. If the last, he has combative tendencies aroused by a fancied infringement on his rights, and violent deeds are not unfrequent under such circumstances. It is a matter of every-day experience that men who are violent and uncontrollable in a hospital built on the cell plan quiet down and become the most tractable patients of a hospital built on a hospital plan.

The internal construction of a hospital for the insane is, therefore, of no less importance than its external appearance. It is therefore necessary to inquire what system of internal construction has been found to answer best. Prominent among those active in solving the problems of hospital construction for the insane have been the physicians of England, Ireland, and Scotland. And as Dr. P. M. Wise,[1] of the Willard Asylum for the chronic insane, New York, remarks, the first thing which strikes a visitor to the institutions in those countries is that in the county hospital for the insane, the single room accommodation rarely exceeds 20 per cent of the whole. The associated dormitories frequently contain fifty beds or more, with a few single rooms attached for exigencies. Associated dormitories, it appears, are the prominent feature of the hospitals for the insane of countries where most progress has been made in the treatment of the insane.

Dr. Lalor,[2] of the Richmond District Lunatic Asylum, Dublin, Ireland, after an extended trial of a few associated dormitories, recommended that a "number of long, narrow, unsocial corridors and cheerless single rooms, be converted into large day and sleeping rooms." As a result of this, "far superior means of supervision, of occupa-

[1] Alienist and Neurologist, Oct., 1882.

[2] Reports for 1878–1882.

tion, and of amusement were afforded, while the accommodation for the insane was greatly increased at a small cost." Of these associated dormitories, Dr. R. Boyd,[1] a leading English authority on construction of hospitals for the insane, says: "The abolition of single rooms and cells and the substitution of associated dormitories is a great improvement, as it does away with the prison-like appearance, which has a depressing effect on those mentally afflicted." Dr. G. F. Blandford,[2] another prominent English authority, says: "The abolition of solitary cells and the association of patients by night and day also conduces greatly to their quiet and well-being," and this is also the opinion of Dr. Mackintosh,[3] a prominent Scotch authority. Dr. Wise cites these associated dormitories as one of the features in which English, Irish, and Scotch asylums compare favorably with those of the United States. Dr. Pelman,[4] a leading German authority, bears equally strong testimony to that of Dr. Boyd, and the changes introduced into France, Italy, and the Scandinavian countries are more or less modelled on the examples set by the asylums of Great Britain and Ireland. It may, therefore, be accepted as settled by European experience that hospitals constructed with extensive associate dormitories are best adapted for the benefit of the patients. There are certain objections which are likely to arise as to this dormitory system. At first it would seem as if a greater amount of restraint would be rendered necessary, but in the countries where the system is most followed, in Ireland, England, and Scotland, restraint is reduced to the greatest possible minimum.

The question of adaptation to American hospitals

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[1] Journal of Mental Science, vol. xvi.
[2] Ibid., vol. xxiii.
[3] Ibid., vol. xvi.
[4] Ibid, vol. xvi.

naturally arises. It does not certainly follow because a thing has been found practicable in Europe that the same will be successful in America. With regard to this question, Dr. Wardner,[1] who has had an unwilling experience, caused by the fire in his hospital for the insane at Anna, Ill., says: "These patients have been contented, and the number of escapes has not been as many as in former years. Sleeping in such large associate dormitories seems to have had the effect of keeping them quieter, and with the exception of occasional excitement from epileptic attacks, there has not been as much disturbance as would have occurred with the same number of sane people lodged in the same room. Those who had been seriously noisy and disturbed their neighbors, while occupying single rooms or small dormitories, out of consideration for others or in consequence of the restraining influence of numbers and the eye of the night attendant, became quiet and acquired the habit of keeping still, and of sleeping well. In fact, a general improvement has been observed in both mental and physical health." Dr. Catlett,[2] of the Hospital for the Insane at St. Joseph, Missouri, who had a very similar experience, says: "I extract from the valuable crucible of experience lessons in therapy and provision for insane, which tend to convince me that the model asylum edifice of this era of psychological activity is perhaps erected both at the too great expense of the humane public, as well as opposed to the best hygiene and curative interest of the improved and chronic insane; or, in other words, I am almost persuaded to assert my belief that less expensive segregated cottages, erected on asylum farms, for the treatment of the improved and chronic insane, sufficiently near the main edifice where all can be under one supervision, and where exchange of patients

[1] Alienist and Neurologist, 1881.

[2] Report for 1881.

may readily be made, when the condition of the patient requires it, would be a very great improvement in the present mode of provision and treatment of the insane."

Dr. Hurd, of the Hospital for the Insane at Pontiac, Michigan, says, speaking of the necessity for future provision for the insane in Michigan: "A more feasible means of relief would be the erection of supplementary buildings in connection with each one of the present asylums for the insane, for the care of selected patients, in good bodily health, who do not require that constant supervision and care which are required by certain classes of the insane. Such buildings need not be expensive. The great bulk of patients occupying them could be cared for in dormitories, and a large degree of personal liberty could be afforded. Such patients would secure what they require to make them comfortable; namely, constant, responsible supervision on the part of persons who are thoroughly familiar with their necessities, and careful personal care from selected, well-trained attendants. Patients could be transferred from these detached buildings to the main Asylum whenever their condition required a different degree of care and a more constant supervision. It is my individual opinion that these supplementary buildings should accommodate patients of two classes. First and primarily, cases of chronic disease who have become thoroughly asylumized and who look upon the asylums as their home; patients who are interested in the daily employments of others and who are able to enjoy a certain amount of liberty. These buildings should be erected in blocks and should be without airing courts, strong rooms, or expensive architectural arrangements. There should be large central dining rooms to accommodate patients of each sex. Much of the labor of preparing food, care for the wards could be done by patients under the supervision of trained attendants. Work-shops could also be erected in close

connection with the buildings designed for this class of patients. Their labor is much more valuable than the labor of any other class of the insane, and they can be trusted with simple tools with greater safety. The second class to be accommodated in detached buildings is convalescent patients. There should be erected in connection with each institution two cottage buildings to be used as convalescent wards. They should be entirely detached from the regular building, and patients should be sent there who are in a condition to appreciate and receive benefit from increased liberty. They should constitute half-way houses on the journey toward home, and should be designed to prepare patients for restoration to the home circle. Buildings of the character mentioned can be operated in connection with the present asylum buildings at less proportionate cost than institutions for the chronic insane simply, and their working would be vastly more satisfactory. After a careful consideration of the subject, I am of the opinion that thirty per cent of the present inmates of asylums could be provided for thus. All classes of the chronic insane could not be cared for in this manner, and no attempt should be made to take them from the central asylum building. The removal of this number of patients would leave the wards designed for the treatment of curable cases free to be used for that purpose. The experiment has been tried satisfactorily at Middletown, Connecticut, at London and Kingston, Ont., at the Government Asylum at Washington, and at Kankakee, Illinois. The most satisfactory arrangement doubtless exists at Washington, where a building designed for 240 patients has been in operation for several years. At London, Ontario, out of a population of 900, about 360 are provided for in this manner."

Dr. A. M. Shew[1], of the Connecticut Hospital for the In-

[1] Report for 1883.

sane, says: "An appropriation of $8,000 was made to conclude a purchase of some ten acres of garden land adjacent to the New Hospital, together with the dwelling-house and other farm buildings. Since obtaining possession, the house has been furnished and occupied as a cottage for 20 quiet female patients, thus making the third dwelling used in this way. One of these is a large frame house formerly used as a hotel or boarding-house at the Silver Mine on the river bank, one mile east of the Hospital. Here 33 quiet male patients are provided for, where they have healthy employment at garden work, and greater freedom. Another, is the white wooden dwelling-house on the farm, near the river, one-half mile from the main hospital. Here 20 female patients find a comfortable home and extended privileges. All of these dwellings are heated by stoves and lighted by lamps. The windows and doors have ordinary blinds and locks of farm houses. The patients are virtually at liberty while under the observation of experienced attendants. With so much freedom and apparent self-control, the question naturally arises, Why retain these persons under hospital supervision at all? Why are they not discharged? Simply because they have no other home, and some at least show perverted propensities and disturbing habits, rendering their presence in society a source of unpleasant solicitude. Is it not apparently desirable in this day of philanthropic efforts to be occasionally reminded that sane communities have rights that should be respected, as well as the afflicted classes? Scarcely one of these 73 patients, if taken before a jury on a writ of *habeas corpus*, would come up to the arbitrary legal definition of insanity, and yet they are without exception defective, perverted, or diseased to such a degree that they will continue during natural life a burden to society."

Dr. Kiernan,[1] at one time assistant physician of the Ward's Island New York City Hospital for the Insane, states that the overcrowding of that institution led to the use of associated dormitories, which were attended by good effects, and Dr. Godding,[2] now of the Government Hospital for the Insane at Washington, from an experience at the Taunton, Mass., Hospital for the Insane, is of opinion that associated dormitories for seventy-five patients are unattended by bad results. Dr. Dewey,[3] of the Kankakee Hospital for the Insane, says: "Institutions for the insane were at first only founded for public relief and without the idea of benefit to the insane. It has always been a too general impression that the insane were essentially different from the sane in everything; instead of the fact being recognized that they possess natural traits and activities, which are, however, modified through the agency of disease, wrongly directed or held in abeyance; and this mistake has been very mischievous in its effects upon the provision for them, preventing the supplying of a natural and domestic abode, adapted to the varying severity of different degrees and kinds of insanity. The essential difference between an institution for the insane and all other institutions; in confining and controlling those who are held as prisoners, without being guilty of any offence, and who are entitled to the utmost privileges and considertion of their wants, without possessing in the eye of the law or in the exercise of reason, the ability to enforce their claims, was long overlooked, but has come to be more fully appreciated. Gradually insanity has come to be recognized as a disease, hospitals have been founded, mainly for curative treatment, and the congregate asylum has been developed; admirable for its purpose, but not

[1] Lectures on Insanity.
[2] Letter to Kiernan.
[3] Alienist and Neurologist, 1884.

adapted for universal application to the entire body of the insane. Finally the infinite variations among the insane, in the manifold forms of the disease; in the degree of reason and self-control possessed by different individuals or characterizing different groups of the insane as a whole; in the various classes of private and pauper, criminal and innocent, epileptic, inebriate, etc., are beginning to be more fully understood by the public and the medical profession, and a variety is being introduced in the erection of buildings, as to location and internal arrangement, by which an appropriate environment for each and all is sought to be attained, while at the same time the opinion gains ground that the domestic or 'segregate,' as contrasted with the 'congregate' or 'institution' idea, should prevail for a large proportion, in providing for them economical and substantial buildings, with as much of the house-like and home-like character as in each instance the fact of insanity would permit."

The value of associated dormitories depends upon well-recognized psychological facts already outlined by Dr. Clouston. Kiernan[1] says in this connection: "The removal of the patient to a hospital for the insane acts in this manner often. At home, the patient is the centre of an anxious family who aggravate his condition by the means they adopt to soothe him. His concentration in self is not disturbed, and his delusions grow and sway him. In a hospital for the insane, he is a single individual part of a community, in which he soon learns that, if its rules be not obeyed, he is deprived of certain privileges. This induces self-control, and tends to impress the patient with a much-needed fact, that he, with his greatness or his woes, is not the centre of the universe. It has occasionally been observed that compassion for other people is a means of initiating recovery. In a case reported by Barstow, com-

[1] Lectures on Insanity.

passion for a little child led to a patient's recovery. In a case observed by myself, a patient recovered by the feeling of indignation excited by an attack made by a strong man on a little boy. Previous to this attack, the patient was wrapped in his own lugubrious ideas, and, up to the very minute of the attack in question, was complaining of his bitter fate. After the attack, he spoke of nothing but it; he was much excited, and when calmed, was found to be much more cheerful than he had been in weeks." Morel[1] reports the case of a melancholiac on whom all enlivening matters exerted a depressing effect. He took the patient to an orphanage, and she, who marched groaning through museums, theatres, and galleries, cast looks of intelligent compassion on these poor children, when seemingly unobserved. At Venice, she was very decidedly affected by the sight of a dying woman who held to her breast two young children. The melancholiac spontaneously asked for the two orphans, lavished upon them the utmost tenderness, and from this time began to recover. Dr. Fisher, of the Boston Lunatic Hospital, says: "I have been struck with the remarkable forbearance of some of the patients for the disorderly and disturbing idiosyncrasies of others," and the same point is well borne out in the remarks of Dr. Wardner already cited. A question arising out of the construction of associated dormitories is that of how many small rooms shall be provided for exigencies in as close proximity as practicable, provisions being made for the exclusion of sound. There are no very certain data to serve as a guide, but in some American institutions three single rooms to each associated dormitory of twenty-five patients has not been found to be an excessive one. It is, therefore, clear that this system is practicable in the United States.

The question of cost is another very serious question to be

[1] Traité des Maladies Mentales.

considered. From the experience of Dr. Lalor, already cited, it is evident that a hospital built on the associated-dormitory system costs less than one built on the cell plan. Dr. I. Ray[1] accounts for the great discrepancy in cost between American and European hospitals for the insane by this very element of associated dormitories. He says: "The point which may account for comparative cheapness of construction in Great Britain is that a much larger proportion of the patients sleep in associate dormitories. In Scotland this is especially the case. In the pauper hospital for the insane at Morningside, Scotland, with some hundreds of patients, there were only a dozen single sleeping-rooms."

ATTENDANTS.

As to the means of training attendants, Dr. Clouston makes the following excellent suggestion; speaking of a new ward, he says: "Another purpose I have had in view all along in getting it up. In future it is to be the probationary ward and training-school for all the new female attendants. They are to be sent three for a time, at first to begin their work by learning to nurse the sick, and to look on all mentally affected patients as really sick. If anything will produce a habit of kindness and forbearance, this will be likely to do so, and I anticipate much good to result to the patients from this training and initiation of the attendants into their duties. The feeling, above all others, I would like to instil into our attendants, is that feeling of professional interest in their work and pride in it, which a doctor has, and which an educated trained nurse has."

It is clear that during the day the patients should be brought into contact with as many attendants as possible, since provision for the provision by the hospital

[1] Journal of Nervous and Mental Disease, 1878.

authorities of no more attendants than can do routine duties prevents attendants exercising the proper control over their patients, prevents them from inducing the latter to labor, and also renders necessary more restraint than is desirable. An overworked attendant can neither be as cheerful nor as disposed to make allowances for the outbreaks of the patients under care as is desirable for their proper treatment; there can be but little doubt that many of the cruelties perpetrated on the insane are perpetrated in institutions too scantily supplied with a sufficient staff of attendants. In the English, Irish, and Scotch institutions, attendants much more rarely perpetrate cruelties than in the institutions of the United States, and in more than one instance an explanation of the cruelty is to be found in the fact that the attendant has been left alone to manage too many patients for too many successive hours. A large staff of attendants implies more labor on the part of the patients, less destructiveness, less chance for cruelty, and inferentially a greater number of recoveries. The English ratio of attendants to patients is therefore a desirable one. In the New York City hospitals for the insane, a proportion of one attendant to fourteen patients has been found to be the lowest number compatible with the proper employment and care of the insane. In the county asylums of Great Britain and Ireland, the preferable ratio has been found to be one attendant to every eleven patients, and it should be remembered that, on account of the almost universal adoption of associate dormitories, this proportion of attendants is really much more effective than it would otherwise be, since one night attendant, under the associate-dormitory system, could better supervise seventy-five patients than one attendant could five under the cell system. Owing to this large proportion of attendants, restraint in the English asylums is reduced to a very minimal amount, and the increased cost

of attendants is very well made up by the decreased opportunities of the patients for destructiveness. If such were not the case, the English rate-payers, who are the governing body of the English county hospitals, and who are by no means inclined to liberality, since they pay for the support of these institutions, would not sanction the employment of so large a number. From the higher standpoint of humanity, the contact of many sane minds, free from the trammels of kindred, and under medical direction, with the insane is very desirable, since it tends to introduce sane ideas into minds which are incapable of originating these for themselves. The insane patient readily perceives, as a rule, the insanity of his associates. A curious instance of this kind is narrated by Dr. Spitzka.[1] In consequence of his attempts to alleviate the condition of the insane in New York, he became known as the friend of the insane. The courts discharged from hospitals for the insane several undoubted lunatics as "sane." Each of these admitted to Dr. Spitzka that every one of those liberated, except the one making the communication, was a lunatic. The fact that others who claim to be sane are justly treated as lunatics naturally leads the insane person to look upon his mental operations with suspicion at times. If we have too few sane minds in constant contact with him, he is, while benefited, rendered somewhat secretive, and this secretiveness retards a recovery which would be accelerated by contact with sane minds properly trained for contact with the insane. In the English, Irish, and Scotch hospitals for the insane, not to speak of the German, Italian, French, Scandinavian, and Swiss institutions which follow in their wake, attacks of furious excitement are neither so frequent nor so prolonged as in the American institutions scantily provided with attendants. This fact is of great significance. Under circumstances which

[1] AMERICAN JOURNAL OF NEUROLOGY AND PSYCHIATRY, vol. ii.

it might be imagined would aggravate the disease, it is alleviated. It is important in this connection to ascertain the qualifications of English attendants. According to Buknill and Tuke[1]: "A good attendant ought to be a good observer, to have the natural power of remarking differences between one patient and another, and in the same patient at different times; keen to notice circumstances which distress and those which soothe; apt to remark all signs of disturbance and danger, and all means of influence. . . . Mere apathetic good humor is a negative quality, if not a disadvantage. An attendant, on the other hand, should not be fussy, but should gain and maintain influence by constant care and kindness."

With attendants in the ratio mentioned and chosen for their possession of the qualities cited, it is not at all astonishing that the English should be able to do so much for their patients, and that the types of insanity frequent in the United States should present somewhat different features, since the entire management of the hospital aims at the treatment of the patients. It is my opinion that attendants are treated too much on the *de-haut-en-bas* principle by superintendents, and the English have inaugurated an excellent system in inducing the attendants to write essays on the intellectual phenomena of their patients, such an exercise tending to make them take a greater interest in their patients. I am of opinion that the association of male and female attendants is viewed with too much suspicion. I have endeavored to choose my attendants of a good class and then trust them in these particulars. I have never had any scandals arise in consequence; where the opposite course has been followed in hospitals for the insane, scandals of this kind are frequent.

Dr. C. F. Macdonald[2] very truly says: "It will be seen

[1] Psychological Medicine.

[2] Report of the Auburn, N. Y., Criminal Lunatic Asylum, 1882.

that "the good attendant" must necessarily possess superior and peculiar qualities of both head and heart to enable him to acceptably discharge the numerous and trying duties incident to his position. He must be prepared to perform offices of a repulsive nature and which are not seldom rendered difficult and more repulsive by reason of the resistance and opposition which insane persons frequently offer to efforts in their behalf. It not infrequently happens, on unlocking them in the morning, that it is found they have soiled not only themselves, but their bedding, and even the floors and walls of their rooms, with their excrement. Such patients must be bathed, their under-clothing and bedding changed, and their rooms cleansed and put in order before breakfast, a kind of work which, to say the least, is not conducive to appetite; again, attendants must not only consent to serve long hours for comparatively small wages, but must exercise control of temper under the widest range of provocation, embracing insulting and abusive language, groundless accusations and even assaults on the part of patients, endangering both life and limb. They are constantly reminded by the medical officers that to strike a patient is one of the gravest offences, and which, if proven against them, will lead to instant dismissal with forfeiture of a month's pay; that they must constantly bear in mind that patients are irresponsible beings, against whom they must harbor no ill-will, but must feel and act as kindly toward the most disagreeable patient as they do toward those that are pleasant and agreeable. While it occasionally happens that an unsuitable person succeeds in obtaining employment as an attendant despite the rigid scrutiny to which applicants are subjected, in the constant endeavor to select from among those who seek to enter the service only such as are apparently possessed of the qualifications which are necessary to enable them to discharge the arduous, trying,

and often thankless duties that fall to the lot of an asylum attendant, it may truthfully be said that instances of brutality, on the part of attendants, are exceptional, infrequent, and of short duration. On the other hand, it may, with equal truthfulness, be said that the majority of asylum attendants are painstaking, faithful to their trusts, and merit public confidence and esteem, instead of the distrust, misrepresentation, and hasty condemnation which are so readily, and often wrongfully, bestowed upon them. Instances of heroic, self-sacrificing devotion to duty on the part of attendants are of frequent occurrence."

Dr. Gerhard[1] says: "The success of a hospital depends, to a very great extent, upon the character and faithfulness of the attendants. These cannot always be secured when needed, nor retained after they have become efficient. The duties of an attendant demand more good qualities of mind and heart than are always found in one person, and the compensation—particularly of male attendants—is not so liberal as in many other occupations, where the labor is less confining and more pleasant. An attendant upon the insane should have good health, a fair education, an exceptionable character, firmness, kindness, a genuine interest in the work, tact to meet the various moods and dispositions that have become perverted by disease, and yet be able to perform the most menial duties, often under very trying circumstances."

FEMALE ATTENDANTS IN MALE WARDS.

Dr. E. Cowles[2] says that: "The objections to the employment of female attendants are twofold: First, the possible impropriety in associating female nurses with insane men. Second, a practical difficulty in administration, in accommodating the duties of male and female attendants, the

[1] Report of Harrisburg, Pa., Hospital, 1883.

[2] McLean Hospital for the Insane. Reports for 1881 and 1882.

one to the other, in a harmonious way. These were generally regarded as controlling objections by the superintendents of some fifteen English, Scotch, and French hospitals, which I visited two years ago, when I made special inquiry into this subject, having already determined to carry out such a plan here. It was granted that it would be a good thing, but nowhere had the plan been put to a complete practical test in the general wards of an asylum. Dr. Bayley at Northampton, England, employed a few women as 'bed-makers;' and Dr. Batty Tuke, at Saughton Hall in Scotland, was just then trying the experiment of employing a lady to act in a social capacity among the gentlemen in his private asylum. I chose a matronly, ladylike, discreet, and amiable woman, and to place in her charge all the housekeeping duties of two adjoining wards. These duties include the sole and undivided control of two dining-rooms, the charge of the ordinary housekeeping, care of the wards themselves and their appurtenances, and of the chambers, the bed-making, etc. She is assisted by one or more wardmaids, whom she directs in their work, and by the assistant male attendants. She presides at the table, and contributes to the social life of the wards as if she were *mistress* of the house. There is a head attendant, however, who is *master* of the ward, who has general control of its affairs, the immediate charge of the patients, and of his assistants. The nurse takes her turn in watching the ward when other attendants are absent, and thus in many ways fills the place of a male attendant. For the majority of insane men, this is practicable; and every day's experience with it teaches me to prize more highly its value. To put a man accustomed to the comforts, or even if no more than to the habits, of domestic life, into a restricted association with men, would be to him an experience of which he probably has had no previous conception. Such a way of living

would be unnatural and unattractive to most men, and to the sick man, whose mind is already disturbed, a cause of added discomfort. In such an association of men alone, the inevitable tendency is to degenerate in manner of speech and conduct; and this is true both of the patients and, what is very important, of the men nurses also. There is something lacking after all efforts to make the wards homelike and agreeable. The presence of female nurses in most of the wards, and of young women as ward-maids, is as easily managed as in the wards of a general hospital. Although some of the conditions differ, there is much to prove the practicability of this in ordinary hospitals, in the successful management of all the men's wards of the Mount Hope Retreat at Baltimore, by the Sisters of Charity. The insane man coming into such a ward is restrained and softened, and practises instinctively a degree of self-control that he would not have thought of trying to exercise in the presence of men alone. His first impressions upon entering the asylum are far more agreeable than in the former case, and continue so. The special qualifications of women for the care of the wards and the sick are of great value, and the moral and curative influence of their habitual presence in our wards for men is positive, and would not be willingly given up. The good results that have followed this practice flow directly from its influence in stimulating the exercise of the remaining sound elements of the mind, and of healthy and decent habits of thought and conduct."

Guided in a general way by the principles here laid down, there is but little doubt that the course here advocated, if not followed out in too doctrinaire a manner, would be beneficial. Dr. Fisher says, respecting the question of such a procedure in his hospital (which is one like my own), that: "The difficulties are greater in the way of such a practice

here, but I am sure great good would result from a suitable female supervision of the male wing."

RESTRAINT.

I now approach a much disputed question, and shall endeavor to view both aspects of this subject from a standpoint of the welfare of the insane only. Dr. Godding has in the main well said: "In the treatment of the insane, the procrustean is worse than crib bed. There is too much fashion in psychiatry, as in other medicine. When treatment crystallizes into stereotyped methods, be sure that some unfortunate individuals are crushed between the angles of that crystallization. We cannot allow this mania to pass into dementia under the most orthodox method of restraint or non-restraint, leaving anything else undone to avert it. It will not do to let this man go down in obedience to some dead man's dictum, for if he dies it is in our hands. We are not called upon to offer hecatombs to the manes of great names, however famous, founders though they may have been of whatever systems. We have the right, nay, ours is the necessity, of individual responsibility, and we are morally bound to leave nothing unattempted to save the life, to restore the mind. New remedies, mechanical restraint, the pack, the douche, the merits or demerits of all systems, are not to be decided for us by popular clamor. A howl is neither science nor argument, and in the line of his duty a brave man will not allow himself to hear it. Let us not forget what Dr. Meynert has said of the cruelty of keeping congested brains in the horizontal position by means of a crib bed,[1] and, at the same time, let us remember that there is a mania depending upon anæmia of the brain which, in the stage of exhaustion, demands the horizontal position, if

[1] I do not agree in this with Dr. Godding. I think a crib bed is a useless and dangerous apparatus, and have not one in my hospital.

the life is to be saved. We are not to delegate our responsibility, or hide behind any great man's shadow. Not that we are better judges of insanity, or wiser, or abler in any respect than they; but that in the individual case before us judgment has come to us; it is our opportunity, and, regardless of what another, in our place, might think or do, we must stand in our lot, 'Doing the right, as God gives us to see that right.' They boast of the Belgian, the French, the English, the German, the American systems in the care of the insane. There is good in all systems; there is evil also.

'Our little systems have their day;
They have their day and cease to be.'

"True science is never divided against itself. There is but one right way, but only in eternity may we know it; yet even now, in our time, in every land and under all systems, in this noblest service of humanity, honest endeavor, integrity of purpose, and self-denying devotion, are doing their work and finding their reward, transcending the system to save the man. In the temple of psychiatry, to-day, modern philanthropy writes over all this inscription: 'He opened their doors; He broke their chains,' and says there is no higher line than that. But the humanity of another age will write above it: 'And they brought unto Him those who were lunatic, and He *healed* them.'" This view is taken from within the hospital gates.

From without them, Dr. Spitzka[1] says: "Much has been written about the use and abuse of mechanical restraint. That this means of controlling the insane has been pushed to an extent unwarranted by the emergencies of the case there can be no doubt. The experience of the criminal lunatic hospital superintendent, who is to-day able to manage an unruly and dangerous class of patients

[1] Op. cit., p. 401.

with a minimum of restraint, while one of his predecessors not only used a maximum, but also fired an occasional bullet among his charges, is a significant commentary on the correctness of the position taken some years ago by the Neurological Society on this question. The concealment of restraint apparatus, particularly of that variety known as the Utica crib, when foreign alienists visit a prominent institution in New York State, is a confession that the apparatus and its frequent employment are, to say the least, features of which no hospital can be proud. On the other hand, it must be admitted that the agitation against restraint has overstepped the bounds of legitimate criticism and reform. That there are some subjects who require restraint, who are better off with than without it, there can be no doubt. The demonstrative feat of a novice superintendent who burned[1] all his restraint apparatus as soon as he took charge of the institution was followed by the accumulation of black eyes, bloody noses, and other minor surgical accidents, as well as several suicides. It is with this question, as with many others relating to the internal economy of hospitals for the insane, reform cannot be accomplished by watchwords and catchphrases, nor by arbitrary legislation. Scientific zeal and humanity within hospitals for the insane prove far better guarantees of humanity to the insane than associations of dilettante and newspaper editorials." It is from the standpoint thus outlined by Drs. Spitzka and Godding that I propose to discuss the present question. The history of the attempt to abolish mechanical restraint in the United States is yet to be written. For more than twenty years Dr. Bryce, of Tuskaloosa, Alabama, has in the main abandoned its use. He has made no theatrical bonfires

[1] Superintendents appointed of late for political reasons, like Dr. W. B. Fletcher, of Indianapolis, have made similar auto-da-fés with that of Dr. Shaw, and with like disastrous results.

of his apparatus nor any ostentatious parade of his principles. As a consequence, few are aware of his sincere devotion to what he regards as the true principle of the treatment of the insane; but even he says: "In the treatment of our patients, we have almost entirely succeeded in discarding mechanical restraint of every kind; and our intercourse with them is characterized by the utmost kindness, candor, and courtesy. There are no leather mittens, muffs, bed straps, restraining chairs, shower-baths, or other terrifying apparatus in use in this hospital. A stout suit of canvass which cannot easily be torn is occasionally placed upon those who persistently destroy or remove their clothing, and it may be necessary to confine to his room a very excited and dangerous patient for a short while or until his paroxysm subsides; but these expedients are seldom resorted to, and never without the approval in each case of one of the physicians. It often happens, for weeks at a time, that no recourse is had to either of the measures above alluded to. In passing through our hospital, especially among the most excitable class of the insane, visitors are surprised to witness so much order, quietude, and contentment on every side. They find the inmates well-dressed, courteous, and often cheerful in their demeanor. They see no strapped and belted maniac to excite their sympathies, nor witness the revolting scenes, nor hear the dreadful noises with which they have been accustomed to associate these institutions. We believe it quite possible that this principle of non-restraint may be carried so far as to be injurious in individual cases. We have often refused to allow a patient to be restrained when we knew that a little judicious coercion would do him good. The great objection to the use of mechanical apparatus for coercing a refractory patient is its liability to be abused. It is easier, safer, and far better, on the whole, whatever may be the advantages lost

in a few individual cases, to discard it entirely when it can be done."

Dr. Alice Bennett[2] says that "mechanical restraint does not, in the majority of cases, restrain. It is not easy by any mechanical appliances to so confine a person that he cannot accomplish something by muscular strength, and energy, checked in one direction, finds some other outlet with the added impetus of resent and desire for revenge. It does exert a sure influence for evil. It is infinitely easier, safer, and cheaper to do without it." Dr. Margaret A. Cleaves[3] says: "Nothing is more certain than that mechanical restraint is incompatible with moral treatment and that resort to it destroys at once any personal influence that may be brought to bear. Whether a confession of fear on the part of the attendant or a substitute for the latter's vigilance, it can hardly fail to lessen the bond of respect between patient and attendant which it is essential to preserve." I shall not cite Dr. J. C. Shaw's results for reasons which may readily be learned by a perusal of the reports of Ripley[4] Ropes, Esq., and the statements of Dr. L. C. Gray; the reasons for non-citation may be summed up in the use of the adjective untrustworthy, to designate Dr. Shaw's statement of his results. To turn to the other side, Dr. J. P. Gray,[5] who is just about as trustworthy[6] as Dr. Shaw, says: "It would seem that the English superintendents have just about the same exceptional experience, and that they find in practice some mode of protective restraint must be resorted to. Their variations of practice indicate that, instead of a settled conviction of the benefit of some particular method, they were disposed

[1] Report for 1882.
[2] Op. cit.
[3] Report of the Norristown, Pa., Hospital, 1882.
[4] Chicago Medical Review, Vol. iv.
[5] Report for 1883.
[6] See Bucknill's Notes on Asylums in America.

rather by a variety of means to apply whatever might be the best to accomplish the desired object of necessary protective control with the least discomfort and risk to the patient. We are obliged to take it for granted that those who have figured as advocates of non-restraint do not really mean the abandonment of all coercive measures; for after all, seclusion against the will of the patient, or the use of padded rooms, wet and dry packing, showering and manual force of attendants, can be regarded in no other light than as restraint. I think it must be admitted from the foregoing that there is no real difference in principle among experienced professional men who have devoted their lives to this branch of science applied to the practical ends of humanity and benevolence. Compared with the manner in which the insane were treated in former times the present system is indeed one of 'non-restraint.' Intelligent medication, exercise in the fresh air, good and abundant food, moderate and pleasant amusements, congenial occupation as far as practicable, combined with comfortable surroundings, have proved a sufficient restraint. Whether restraint by the hands of attendants in seclusion is better than the open association and intercourse with other patients and liberty to move about the wards, only with hands rendered incapable of doing harm by some mechanical means, is a question which experience alone can determine, and I have no hesitation in declaring that experience by all means favors society as against seclusion in such cases. It was shown in this same paper that the so-called 'abolition of restraint' in the English asylums must not be understood in an absolute sense; for whatever theory or line of practice has been adopted, we find there are still cases which require 'strong dresses,' 'endless sleeves,' 'camisoles,' 'tied hands,' 'forcible holding by attendants,' 'wet or dry packing,' or 'seclusion in dark or padded rooms,'

and the reasons generally given for any of these forms of restraint are for 'surgical purposes,' or 'violence and destructiveness,' or picking the face,' or 'to prevent suicide,' or 'self-injury and mutilation,' or 'persistent destructiveness,' or 'self-denuding,' etc. I summed up that paper with the following conclusions which I wish here to reiterate as what every passing year's experience has only served to confirm and corroborate. It would seem that the English superintendents and the commissioners have the same exceptional classes to deal with, and that they find in practice some mode of protective restraint must be resorted to. Their variations of practice would indicate that, instead of a settled conviction of the benefit of some particular method, they were disposed rather by a variety of means to apply whatever might be for the benefit of the patient. The superintendent of a hospita is not a free agent, and whatever the board of managers advises, he is expected to see carried out. Wherever the question of restraint arises in connection with any individual case among his patients, he must judge of the nature and extent of that restraint, and he must be presumed to know and be able to judge between what is cruel and what is humane, protective and curative, as well as the surgeon knows and judges in his operations between necessary pain and useless barbarity. Nobody disputes that mechanical restraint *could be* wholly abandoned. So could the administration of medicine be wholly discontinued. There may be those who are prepared to take this extravagant ground in regard to both; but the real question, at least among experienced men, is whether restraint *should* be abandoned; whether such a course would be best for the insane. It is upon this test our practice must depend, whether in itself the practice be agreeable or disagreeable. I stated in my annual report more than twenty years ago (1860), before most of the agitators of

the present day came upon the stage, that restraint and seclusion were in themselves inadmissible, and only to be used as a necessary and indispensable means of treatment. There is abundance of experience on record in regard to this subject. The discussion of restraint on its merits has long since been so exhausted as to render all that can now be said mere repetition and altogether inadequate as a means of new notoriety. The conclusions of the Association of American Superintendents, of the Psychological Society of Paris, and the German and English authorities who represent experience with the insane, have settled every principle in this matter *and left only the discretion of reducing the minimum to nothing.* But the fact is restraint has *never* been wholly abandoned either in England or any other country. The most that can be said is that certain persons say they do not use it. Their real practice is open to the inquiry whether their substitutes are better for the patient or worse. The practice of not using a remedy which all admit to be only for exceptional cases may conform to a dogma by a physician more than it contributes to the comfort or recovery of a patient, which latter are liable sometimes to be lost sight of in the ardor of defending a theory."

Dr. Nichols says: "I am in full accord with what may be properly called the American doctrine and practice in the use of mechanical restraint and seclusion in the treatment of the insane, which is, as I understand it, that neither mode of treatment shall ever be resorted to unless, in the opinion of a competent and responsible medical officer, protection in particular cases against violence, exhaustive activity, the removal of surgical dressings, etc., etc., can be effected more easily, completely, and beneficially to the patient than the necessary end can be attained by either the hands of attendants, medicinal agents, showers and douches which I consider inadmissible, except in a very

limited number of cases, or 'packs,' wet or dry, which are obviously a very positive form of mechanical restraint, though their therapeutical advantages may now and then be superior to any substitute for them; and that it is the duty of the practitioner to resort to mechanical restraint or seclusion whenever he clearly sees that it is needed upon the grounds stated. Of course, the actual practice in the use of restraint varies more or less in different institutions in this, as I believe it does, actually and necessarily, in every other enlightened country, and is governed, as are other measures of treatment, by the training and character of the medical officers in charge, the opinion and support of trustees, the number and character of patients with respect to the extent and quality of their accommodations, proportion of attendants to patients, scale of expenditure and other agencies of treatment. The restraint needed in the same institution will vary greatly according to the varying conditions of patients. While I still conscientiously entertain the views just expressed, in common with the great majority of my American brethren, and am entirely unwilling to be governed by a prohibitory dogma or an arbitrary proportion to patients in the use of restraint, I am of the opinion that the circumstances that justify its average use in more than two or three per cent of the cases under treatment must be quite exceptional. Seconded by the present assistant physicians of the institution, who have been earnest and efficient in their co-operation in this undertaking, the effort has been made this year to see how far restraint, either by mechanical instrumentalities or seclusion, could be reduced without violating the principles just laid down, and on the men's side of the house, restraint by camisole or bed strap, or by seclusion, was resorted to, in the course of the year, in only eleven different cases, one times in three cases, three times in two cases, four times in two cases, five times in two cases, six

times in one case, and seven times in one case, for periods varying from one to twelve hours. On the women's side of the house, more restraint was used in the early part of the year, but in the last seven months it was used in only two cases, three times in one case and four times in the other, for periods varying from one to ten hours. In the foregoing list of restraint used, is included the seclusion of three different cases of paroxysmal mania in men, and one of general paralysis, four times in two cases, five times in one case, and one time in one case, for periods varying from two to six hours. Seclusion was not resorted to in any other case, and the habit of voluntary seclusion into which certain old cases are inclined to fall has been entirely broken up. I desire it to be distinctly understood that the reduced use of restraint has not been attended by an increased use of nervous sedatives or hypnotics, which have in fact been very sparingly used. On the contrary, I have depended more than ever before upon the composing and indirect hypnotic effects of tonic and stimulant treatment and the use of warm medicated baths and massage at bed-time. It should be mentioned that, while about the usual proportion of excited patients has been treated this year, there have not been any cases of acute delirious mania or other cases of extreme violence in which it is most necessary to husband the strength by confinement to the bed; and that the minimum use of restraint that is consistent with the welfare of active cases of mental derangement requires a large corps of superior attendants."

Dr. Hughes[1] says: "All other things being equal, the less the insane are subjected to irritating restraint in hospitals for the insane the better for the progress of their malady. It is possible, with proper personal precautions and safely constructed buildings, and judiciously chosen

[1] Alienist and Neurologist, April, 1884.

surroundings, to greatly reduce the direct restraint of the insane and abolish all forms of it with the majority of cases. The question is a practical one, to be solved practically, not theoretically, and no one has a right to say to what extent he can go in the direction of non-restraint until he has made faithful trial of its principles. . . . Restraint is an appliance for conservative use only, but, like the knife, there are times when it would be cruelty not to apply it."

Dr. Kiernan[1] says: "I have certainly had in some cases beneficial effects from the use of the camisole. The idea of imprisonment in it was sufficient to deter the patient from insane acts, and day by day this slight motive had a stronger influence, and the insane tendencies disappeared. The non-restraint system is, however, a potent means of introducing new ideas. The attendant, by constantly ignoring the insane tendencies of the patients, and directing their attention away from themselves, is acting in a manner, as a rule, not attainable under the rabid system of restraint in some American asylums. The other great element of value in the non-restraint system is the individual treatment it entails. The attendant, restricted in the use of restraint, learns how to manage his patients."

Dr. Fisher[2] says: "Restraint or non-restraint has been a burning question for many years. The English hospitals claim to have abandoned the use of restraint, but do occasionally use it in exceptional cases. American superintendents claim the right to use it at discretion, and do not pretend to have absolutely given up its use. As a matter of experiment the camisole was banished from our wards for five months, with the effect of proving the possibility of its total disuse. No other form of restraint is ever used here. It was, however, resumed in a case of

[1] Lectures on Insanity.

[2] Boston Lunatic Hospital Report, 1883.

extreme exhaustion with excitement, in which it seemed necessary to save life, and has been sparingly used under similar circumstances since." So far as an insane hospital experience of four years permits me to form a judgment, I am of the same opinion as Hughes, Spitzka, and Kiernan. I do not believe that the entire abolition of restraint would be for the advantage of the patient, but it should be prescribed, like other remedies, only by the physician.

EMPLOYMENT.

This is the great panacea for the treatment of insanity. In illustration of the much-ignored difficulties attendant upon the employment of the insane, I shall cite the following case, which is a very decided illustration of the ignorant opposition frequently made by friends of patients to their employment. Victor F., age thirty-three; admitted May 29th, 1883; Swede; single. Grew worse after great Chicago fire, and thought a black dog wanted to bite him and witches were after him. The mother is an imbecile with a venomous tongue and full of phrenological nonsense. Patient spends his entire time prancing up and downward, slapping his head, as he says, to keep down bad thoughts. Father died of phthisis pulm. Patient is much better off when at work outside, but his mother raises so many objections, and is so offensive with her accusations against the commissioners and asylum officials generally for "killing her son with work" that he is kept from doing anything to pacify her. This source of opposition is much ignored by dilettante reformers. That employment is decidedly beneficial is shown by English experience, of which Dr. Hurd has given the following valuable summary:

The Bethlehem Hospital, London, is designed for what is known as the middle class, and its patients are mostly accountants, clerks, shopmen, commercial travellers, me-

chanics, professional men, governesses, domestics, house-servants, or the wives, widows, and daughters of clerks or tradesmen. Almost none of them are accustomed to do manual labor, and the majority have neither the inclination nor the physical endurance to attempt it. Among female patients, out of a population of one hundred and thirty, fifty-nine, or nearly one-half, are employed in sewing, fancy work, or laundry work. These are mostly curable patients, as it is the custom to transfer patients who do not recover to other asylums. Among male patients, out of one hundred and four, thirty-five are usefully employed, viz.: Seven in the garden, one in the tailor shop, and twenty-seven in housework. The remainder of the patients were gathered in airing-courts, and amused themselves by walking about or in playing lawn tennis or billiards. Dr. Savage, the medical superintendent, expressed much anxiety to change the present arrangement, but confessed that the problem had thus far been too difficult for satisfactory solution. By dint of great personal exertion he had succeeded in getting an excavation made by the patients for two lawn tennis courts, and had received some assistance from them in rolling the asphalt surface of the same. No systematic effort was made to furnish employment for these patients, and no persistent pressure seemed to be brought to bear upon them to induce them to work. The class of patients under treatment resembled the great majority of our private and indigent patients. None were wealthy, but all had previously been respectable, not accustomed to severe labor, and self-supporting. Dr. Savage says: "The great desideratum is employment for our male patients; the dismal hours spent in useless walking round the airing-courts must be altered sooner or later in some way." How he was to change it did not seem at all clear to him.

The asylum at Colney Hatch is a monster establishment containing about 2,200 patients—1,350 females and 850 males—all of the pauper class. It was found that upon the female side of the house about 50 per cent of the patients were usefully employed. Many of them were engaged in scrubbing the floors and in laundry work, the latter being lodged in the laundry building and spending their whole time in laundry work. In washing and ironing about 140 female patients are thus employed. The hardest and most degrading forms of hall work also seem to be put upon patients. Upon the male side only about 11 per cent of patients are usefully employed. There are tailor shops, shoe shops, and an upholstering establishment, which give employment to a limited number of men. The most of the work done by male patients is upon the farm, and consists in the care of cattle and the cultivation of crops, roots, etc. No systematic effort seems to be made to employ male patients, and no industry is carried on except what has been mentioned.

The Essex County Lunatic Asylum, Brentwood, under the care of Dr. Campbell, is about eighteen miles from London, and is in an agricultural district. It contains 900 patients—400 males and 500 females. Three male patients were at work in the tailor shop, 7 were employed in the shoe shop, 16 in the mattress shop, and 2 in the carpenter or cabinet shop. All of these shops were confined to the work of repairing, and no new articles were made in them. In addition to these, about one-half of the male patients were during the proper season of the year employed in farming operations. Among the females, sewing, kitchen, and laundry work seemed to engross the energies of all who were able to work, and an impression was formed that about one-half were thus employed. It was found that, in the previous year, 253 men and 254 women were usefully employed (by this, of course,

is meant every form of employment, including bed-making, the care of rooms, etc.). Ninety men were employed upon the land, that is, in the garden or upon the farm.

Hanwell, the oldest pauper lunatic establishment in the vicinity of London, accommodates 1,100 females and 800 males. Upon inquiry, it was learned that it was customary to include in the list of persons usefully employed all who did any form of labor, such as the dressing of the person, the making of a single bed, or the carrying of a single dish. Upon a casual inspection of the wards, it did not seem as if as much effort was made to find employment for patients as in our own asylums. On the way to the asylum, a field was passed where about a dozen male patients were supposed to be employed in digging turnips, but little actual work was accomplished. All but one or two were standing listlessly about. The majority of the party seemed to be cases of extreme dementia, and it is probable that the work done was not a fair sample of what could be accomplished by the labor of patients. The average number of male patients daily employed during the year 1881 was as follows: In the kitchen, preparing vegetables, etc., 22 persons; on the farm and in the garden, 44; in the grounds, 186; in the cow-house and piggeries, 15; in the work shops, viz.: the tin-shop, carpenter-shop, painters, plumber, and blacksmith-shops, gas-house, engine-house, boiler-house, tailor-shop, shoemaker's-shop, upholsterer's-shop, 191; in the wards, 125, making a total of 583, or upwards of 77 per cent, which is very high, and probably due to the wholesale methods of computing which have been mentioned. Upon the female side 204 were employed in needle work, 11 in the kitchen, 308 as helpers in the wards, 6 as helpers in officers' houses, and 78 in the laundry, making a total daily average number employed of 607, or nearly 56 per cent of the whole number.

Gheel is very ancient, and the inhabitants of the town

and district have been in the habit of taking care of the insane for the past 800 or 1,000 years as an occupation. It is to them an industry and a source of income. Here only patients who are free from dangerous tendencies are provided for—all suicidal, homicidal, or pyromaniacal patients being expressly excluded from the place. It is here customary to send farm laborers to live with farmers, shoemakers with shoemakers, tailors with tailors, etc., and, each person who takes an insane man to board is expected to get as much work as he can out of him. The very small compensation allowed for the board of the insane patients seems to offer some justification for the practice. Each custodian receives seventeen cents per day for board, washing, custodial care, and personal attention to patients, and out of this amount eleven per cent is paid to the Commune for the maintenance of the Central Asylum. About two-thirds of the pauper class are employed in some sort of work, and in some instances the custodian stimulates the industry of the patient by the offer of a small sum as wages. The Belgians of the peasant class are brought up to the strictest habits of industry, and it is probably not necessary to pay wages in very many instances. Patients of the middle and upper classes, of whom there are many from every country in Europe, are not employed at all. Perhaps it should be added that the restless, aimless wandering of this class of patients about the town gave an air of disquiet which was painful to witness.

The Sussex County Lunatic Asylum at Hayward's Heath is much superior in its construction and general appointments to the asylums in the vicinity of London, and is designed to accommodate about 450 women and 350 men. The patients seemed to be largely of the agricultural classes, and the labor of the men has been well utilized in converting what was formerly an almost barren

heath into a very valuable tract of land. Out of 357 males, 81 were employed upon the land, 58 at the various trades, such as tailoring, shoemaking, and mattress-making, and about 100 in domestic duties in connection with the halls and dining rooms, a total of more than 67 per cent. Of 438 females 68 were employed in the laundry and kitchen, 14 in the dining-hall, 10 in cleaning vegetables, 48 as ward-cleaners, and 170 at needle-work, a total of 310, or more than 70 per cent. The men looked vigorously and healthy, and many seemed to have come to the table for dinner fresh from farm-work. The corridors, dry-rooms, and general dining-rooms were neatly frescoed in stencil-patterns—the work of patients under the charge of a single journeyman painter. All of the work done was of the character above indicated, and no manufacturing of articles for sale was done about the premises. The winter in this portion of England is so mild it is possible to furnish employment upon the farm throughout most of the year. This may account for the comparatively large percentage of the patients who were usefully employed.

The West Riding Asylum at Wakefield is one of the oldest asylums in England, much of the building having been erected in 1814. It has, however, been remodelled several times, and although not by any means a modern institution, is really a very comfortable one. It is designed to accommodate about 1,400 patients—about 700 of each sex. Here for the first time was seen a block of the asylum designed for the accommodation of the workingmen. It was occupied by 120 fairly intelligent workers, who were employed upon the farm and in the various work-shops. The doors of this building were not locked, and patients were permitted to go about freely in the court which surrounded it. No form of labor was carried on in it, however. The shops were in a detached building. The shoe-shop was provided with machinery, and

gave employment to about 20 male patients, or to enough to supply the whole establishment with boots and shoes, and to do all the necessary repairs upon them. Shoemakers' tools were freely supplied to them, and no accidents had occurred from their use. The work done was creditable, and much would be acceptable to a higher class of patients. The boots and shoes of attendants were also manufactured here. In the tailor-shop 15 persons were employed, and all of the clothing for male patients and attendants was made here. Several of the persons employed were apprenticed tailors, but the remainder had acquired their trade in the asylum. Several epileptic imbeciles were said to be capable of considerable efficient labor in both the shoe and tailor shops. There were also cabinet and carpenter shops, but the number of men employed in them was not learned. In the latter was seen busily engaged an epileptic man who was just recovering from an attack of acute mania. There was also a tin-shop and wire-workers' shop provided with considerable heavy machinery. None of those shops had any locks upon the doors, and each was under the care of a competent foreman, who was able to direct all of the work. The mattress shop gave employment to about 30 epileptic imbeciles—men of whose labor it was said no other use could be made. There was also a shop for pounding up sandstone into fine powder for scouring purposes, which gave employment to a number of old men. In the laundry both men and women were employed, and the washing of 1,400 patients was done here with the hired help of five laundry maids. In the kitchen large numbers of both men and women were employed. The rest of the female patients were for the most part employed sewing and knitting. In one ward the hand-weaving of coarse cloth was carried on, and in another the knitting of long window-curtains. Almost the only male patients who were within doors were epileptic imbeciles

and feeble general paretics. Out of 1,400 patients upwards of 1,000 were regularly employed in some useful manner. In no other English asylum visited was there as great freedom from noise and excitement among patients.

The Asylum at Prestwich, near Manchester, accommodates nearly 1,200 patients, and is an old one, but it has been remodelled from time to time until its interior is a model of graceful decoration. The halls were beautifully decorated with furniture, transparencies, statuettes, what-not, chiffoniers, corner cupboards, etc., which had been made by the patients themselves, the sole cost being for the materials used in their manufacture. In engaging attendants it is customary to hire artisans, who are thus able to work with their patients at different sorts of handicraft. All able-bodied patients are expected to work, and if strong and likely to be benefited by labor it is insisted upon—a pressure being brought to bear by the withdrawal of privileges and the removal of the patient who is unwilling to work to halls designed for disturbed patients who do not work. It has been found by experience that regular systematic labor is an effective calmer of excitement, and the occupants of wards for disturbed patients are set at various tasks as a remedial measure. Quite a number of patients were pointed out who were quiet and orderly when at work in shops, even with dangerous tools, but, if confined to the wards and idle, became restless and unmanageable. Every female ward has a sewing machine, and large quantities of work are thus accomplished. During the past year, in addition to the usual making and repairing of the whole establishment, all of the bedding and clothing needed for the new asylum near Preston has been made here. In the most excited female wards, patients were employed in sewing. Out of 550 male patients, about 360 were usefully employed, and out of 650 females, about 520 were usefully employed. An enumera-

tion of the occupations of the male patients, and of the numbers employed at each, will give some idea of the variety of labor furnished. Working on the land and in the garden, 52; ward helpers, 103; engine house, smith-shop, and gas works, 10; office, centre, and stores, 17; kitchen and bake-house, 7; brewhouse, 1; upholsterers, 6; tailors, 8; shoemakers, 15; book-binders, 2; mason, 1; joiners, 11: painters, 7; plumber, 1; earth-closets, 9; farmers and cow-men, 18; carters, 3; wheelbarrow men, 49; dining-room, 17; lodge porter, 1; night watchmen, 4; basket maker, 1; laundry and boiler house, 25; coir-workers, 8.

The Woodilee Asylum, at Lenzie, near Glasgow, is a new asylum, designed to accommodate about five hundred patients, and it was built in 1875 at a cost of $15 per bed. It is substantially constructed of stone, and compares, in point of accommodations furnished, very favorably with American asylums. The dormitories are not as large, and there is a more abundant supply of single-bedded rooms than is common in most English ylums. It is peculiar in that none of the doors are locked, and the windows are not guarded with grates or iron sash. As an adjunct and most important auxiliary to the open-door system, Dr. Rutherford regards the systematic employment of patients. He believes that most of this labor should be out of doors in agricultural operations, and says that patients of the artisan class as a rule make more rapid improvement while working upon the land than they would in work-shops, where each man could carry on his own trade. It is expected that every patient who is able to work will be usefully employed. If a patient who is able refuses to work, he is taken out with the rest and compelled to remain out of doors as long as they, even if he does nothing. In the experience of Dr. Rutherford, the most recalcitrant patient soon became tired of standing about idly in the cold or wet, and went to work. Some patients who

have trades and do efficient work are paid varying sums in addition to board and clothing. In one instance a pound sterling a month was given. Fourteen patients in all receive wages varying from half a crown to one pound a month. This money the patient is allowed to send home to his friends, or to expend in any manner he chooses. Patients of the artisan class who work in the tailor, shoe, cabinet, blacksmith, or tin shops are housed at the porter's lodge. They are called for in the morning by the foremen of the different shops, and are expected to commence work at 6 o'clock and work until 8. Then comes an hour for breakfast, after which they work again until 1 o'clock. Dinner occupies from 1 o'clock until 2 o'clock. From 2 o'clock until 6 they work again, and finally return to the porter's lodge at 6 o'clock to get supper and to lodge. These artisans seemed contented, and their quarters were models of neatness and comfort. A farm house was also visited upon the estate, where twelve farm laborers lived with a man and his wife, and were engaged in the care of cattle and in the ordinary work of the farm. It is also contemplated to erect a farm house for the accommodadation of about fifty patients. Dr. Rutherford thought that at least two-fifths of his patients could be provided for in this manner. The motto of the asylum was said to be "Liberty and Work." So largely was this the theory of the establishment, arrangements had recently been made to dispense with laundry machinery, in order to give female patients a wider range of employment. All of the washing is now done by hand. Out of 486 patients, 409—205 men and 204 women—were usefully employed. The whole establishment was remarkably quiet, and there did not seem to be as much restlessness among patients as is observed where doors are locked.

Upon the 10th of February, the Royal Glasgow Asylum at Gartnavel, near Glasgow, was visited. This is designed

for the accommodation of both dependent and private patients, and in this respect corresponds more nearly with our own asylums. It was found practicable to employ dependent patients here in the various shops and upon the farm, but private patients were not furnished employment to any great extent. In one instance, however, Dr. Yellowlees had insisted as a pre-requisite to the admission of a professional gentleman, a lawyer, that he should take a wheelbarrow and spade and go to work. No statistics were obtained as to the number of patients employed, but it was probably much less than at Woodilee.

The Royal Edinburgh Asylum at Morningside, near Edinburgh, is also designed for the accommodation of both private and independent patients. Here, too, it was found that occupation was very much relied upon as a curative measure. Dr. Clouston considers useful employment a substitution of physiological activity for motor instability. He says that, if some natural healthful outlet is not found for the diseased activity of the person, the patient himself will find one in acts of destructive violence. For this reason he has substituted garden labor, such as digging, wheeling earth, making walks, and laying out grounds, etc., for the former life inside of closed airing courts. There were to be seen one hundred wheelbarrows and other tools to correspond in neat tool-houses adjoining the asylum. There were in addition, tailor, shoe, pipe-fitting, tin, bookbinder's, mattress-making, and cabinet shops. In this connection Dr. Clouston has recently written: "After all, the risk of accident is best met and the necessity of irksome supervision avoided by placing the patient in such circumstances that he works and plays and forgets his morbid humors. Irritability and consequent unhappiness are best diminished by giving scope for expending muscular energy in the open air. To know how this can best be done for each case implies a study

of the case that is good for patient and doctor. I have seen both systems tried. When I came to Morningside Asylum in 1873, there were high-walled airing courts, a 'refractory ward,' and only about 110 out of 300 going out to the garden and work-shops, while it was the rule that no patient was sent out to the garden without special orders. Now we have no 'refractory ward,' no airing courts, 210 patients go out to gardens and work-shops every day, besides 25 who assist attendants. The rule is that all patients go out who are not under orders to stay in, but then an assistant physician sees them go out every morning, and turns back any patient who is not fit to go. I never knew my refractory patients until I had to provide each with suitable employment. And some of the very worst, who had for years been reckoned dangerous men, are now the most useful workers we have. One such man, a perfect type of 'monomania of suspicion,' who used to have a daily fight with some one, is now absolutely the most profitable inmate of the institution, making and mending every copper dish in the place. If fearful sounds are heard in the work-shop court, it is known that 'Joe' is taking it out of his imaginary enemies (for he still has the former delusions) by ferociously hammering a flat tin plate into a form suitable for a kettle. No sane man I ever saw could do it so quickly. If he has a fight, it is only on Sunday." This gives an excellent idea of the part employment plays in the therapeusis of English alienists.

Dr. Bryce[1] says: "In 1880, it was shown that 70 per cent of the men and 86 per cent of the women were engaged, with reasonable regularity, in some useful occupation. During the past two years it has been our aim to employ even a larger proportion than this in the work of the different departments of the institution. Every man that is willing and well enough is allowed to engage

[1] Report of the Tuskaloosa, Ala., Hospital for the Insane, 1833.

in some congenial labor. Accompanied by his nurse, he goes out at a regular hour morning and afternoon into the field or garden, or into the shops, according as his tastes and inclination dictate, and remains there during the regular hours of work. Keeping continually in mind that it is not the value of the work done, but its remedial effect upon the patient that is desired, he is never driven to his task nor allowed to exert himself excessively or injuriously in its performance. It must never be forgotten that insanity implies disease, and that the physical powers of the insane are not equal to those of the sound in mind and body. So thoroughly impressed are we with the hygienic value of occupation that the effort is constantly made by the officers and employees of this hospital to engage every man and woman not laboring under the acute forms of disease in some pleasant and suitable occupation. Among the women, these efforts have been most successful. There is scarcely a woman in any of our wards, including many of those demented and almost helpless creatures who are unable to express their wants, who are not found either carding, spinning, knitting, cutting quilt patches, sewing, or otherwise pleasantly engaged in some simple, easy work. Among the men, especially those who are not physically able to engage in out-door work, it is not so easy to find suitable and pleasant occupation, and the result is that they neither enjoy as good health nor are they half so well contented as the same class of women. The success of this system, so far at least as it extends to the feeble classes or those confined to the house, may be said to depend upon the tact and efficiency of the matron and male and female supervisors. There are patients whom it appears at first impossible to engage in any kind of useful work, and it is only after repeated trials that something can be found to interest them. Perseverance, however, will generally succeed. There are some indeed who can never be

induced to engage in anything useful, but will cheerfully devote their time to some artistic pursuit—to drawing, painting, or the fabrication of useless articles of dress or ornamentation. The effect, however, is the same."

As an evidence of what may be done with a very unsatisfactory class of the insane, and under disadvantageous circumstances, the experience of Dr. C. F. Macdonald[1] may well be cited (the Auburn Hospital has no farm). He says: "The manufacture of shoes and slippers for the men was commenced in January last, and has been in successful operation since that time, from one to two patients being thus daily employed. With the exception of a few pairs required for the women, all of the shoes and slippers, and all repairs to the same required by the inmates, are now made by patients, while at the same time a saving in cost is effected and a much more durable article obtained. An effort has been made to provide further occupation to such of the patients as were desirous of and able to work, and who were likely to be benefited thereby, by sending them out on farms in the vicinity of the asylum to work on shares. Care was exercised in the selection of patients, in order that only those who could be relied upon to conduct themselves properly might be allowed to go, each party sent out being in charge of one or more responsible attendants, who usually worked with them. During the husking season last autumn, an average of fifteen, and some days as many as thirty patients daily, were thus employed in husking corn on shares. By this means the Asylum realized sufficient corn to fatten upwards of thirty swine, also a large quantity of husks, which were 'split' during the winter and used for filling beds, being far superior as regards comfort, durability, and cleanliness to straw, which heretofore has had to be bought for that purpose. When the proposition to employ patients in this

[1] Auburn, New York, Criminal Lunatic Asylum Report, 1882.

manner became known in the vicinity, their services were eagerly sought after by farmers living within a radius of five miles, who willingly transported them to and fro, gave them warm dinners, and returned them to the Asylum before dark. Applications for permission to go, on the part of patients, were so numerous that some had to be denied, and all who obtained the privilege behaved well and did satisfactory work. A noticeable improvement has been observed in the condition of every patient sent out to work, while, in two instances, complete restoration of mind resulted where recovery was not expected."

The results of my own experience are very well summed up in the words of Dr. Hurd: "Industrial pursuits of some sort need to be made more prominent as a curative agency in asylums. They are needed to give an outlet to the diseased activity of the insane, and to divert energy which would otherwise be expended in acts of destruction into healthful channels. They are above all needed if we would dispense with the use of restraining apparatus. It is not intended to discuss in this conneetion the question of restraint or non-restraint. An extreme position in favor of either must be regarded as unwise. That restraint unwisely applied renders patients irritable, destructive, degraded in habits, and uncomfortable, all will concede. If, therefore, healthful employment can be substituted for restraint in the majority of cases, a very important point will be gained. That such is the case, the experience of Scotch asylums has established. Non-restraint and employment must go hand in hand, each is impossible without the other. Many difficulties in the way of useful employment for insane people arise from the fact that asylums accommodate both private and dependent patients. This ought not be an insurmountable obstacle. If employment is a remedial measure for the pauper patient, is it not equally so for the dependent or private patient? If its usefulness

can be established, it would seem practicable to prescribe it equally for all classes, although possibly not to the same extent. At the same time, it is undeniable that the presence of private patients in asylums tends to complicate the problem materially. Another obstacle is to be found in a class of patients; the vast majority have worked too continuously at home, and at first they need rest and quiet, nutritious food, and freedom from exposure and fatigue.

Still, it is possible to employ without fatiguing, and there is less danger of exhaustion from systematic labor applied under the safeguards of medical supervision than from the purposeless and perverted activity of insanity. It is impossible to give much variety to this occupation. Many fancy that, under a perfect system of employment, the painter, the photographer, the tailor, the shoemaker, the upholsterer, the carpenter, the bricklayer, the lawyer, the minister, and the doctor could all find employment each in his own avocation. This, however, is not feasible or desirable. It is preferable during the summer months to give all such employment as will keep them in the open air as much as possible; in the winter, this employment should be such as can be carried on without undue exposure to the weather. Work upon the farm and in the garden will unquestionably be the best for men in the summer. For the winter there should be work-shops, comfortably warmed and well lighted, for the mattress-making, the chair-seating, the stocking-knitting, etc. For women the problem is a more difficult one. At present, women occupy themselves, as a rule, much more regularly than men in sewing and house-work. Their occupations, however, are not in the open air, nor are they as invigorating to health as farming operations for men. Many women do not know how to sew, and to many the confinement to one position which such work entails is irksome. For such, more active employment should be de-

vised. Many undoubtedly would be benefited by laundry work, if laundries were so arranged that women could work in them without contact with men. Many also would be able to prepare vegetables if kitchens were similarly arranged. The rule once established that all persons physically able should employ themselves, it is extremely probable that sufficient work can be found. Employment of some sort should be made obligatory upon able-bodied patients. This, of course, should not be made compulsory, but it should be the custom to give favors to those who work, or even to pay trifling wages to such as require that inducement."

FURLOUGHS FOR THE INSANE.

The present question is a by no means simple one. That the insane who have seemingly recovered should be tested before being restored to all civil rights would seem to be a matter dictated by the most ordinary prudence. Such a procedure would seem to be the very one calculated to diminish the chances of persons being kept too long under hospital treatment. For these reasons it has been strongly urged by some superintendents of hospitals for the insane, and as strongly opposed for other reasons by others equally conscientious. Every advantage which can be claimed for the furlough system might be granted by its opponents without impugning in the slightest the reasons for not adopting it. These are rather of a practical than a therapeutical character. In the first place, friends of patients who are being treated in a hospital for the insane are very jealous of each other, and apt to regard the furloughing of a patient not as a therapeutic measure, but as a privilege granted to that patient's friends. In consequence all sorts of influences are brought to bear on the superintendent to secure furloughs for unsuitable cases.

In regard to these, Dr. Goldsmith[1] states: "I have allowed 139 patients to leave on furlough, or trial visit, during the year 1882. This means that friends are allowed to take patients away, with the understanding either that it is to be simply a visit, or to make trial of their capacity to live permanently outside of a hospital, and return them without new legal commitment any time within thirty days. There is no statute regulating this practice, but it proves a great comfort and benefit to many patients whose friends are ready to take them home on such terms, but would not be if they anticipated the trouble and annoyance of a new commitment. I think it would be proper for the State to specify, by legal enactment, the conditions under which this can be done. Eighty-four of those who left in this manner were not returned." Under proper legal supervision, the insane might be furloughed, especially in States whose laws throw too many obstacles in the way of hospital treatment, but the dangers of insane males and females procreating children should not be forgotten.

CORRESPONDENCE CENSORSHIP.

There are two views taken as to the necessity of a censorship. The negative side is thus voiced by Dr. Cowles: "The patient and friends are carefully informed at the outset that no writings of the former, sealed or unsealed, will be intercepted by the asylum authorities, who prefer to be relieved of that responsibility. The patient is told that whatever he writes will be sent to the persons who are to be regarded as the natural or legal guardians, or to other proper persons agreed upon. Most patients readily join in this compact, if made at the outset, and the attitude thus taken by the superintendent increases greatly his influence over the patient in advising or checking him

[1] Danvers (Mass.) Lunatic Hospital Report, 1883.

in regard to writing. It often happens that, what one is free to do, he does not care to do, or, if he becomes dissatisfied sometimes with the action of friends in arresting letters—as, of course, must be done for the protection of the patient from consequences he would afterward regret—there is, as a rule, a good reason to be given. At all events, it is found that dissatisfaction is reduced to a minimum; and it is made clear that there is no reason known, as far as the asylum is concerned, why all letters should not freely go from it. It is easy to gain through friends the valuable information concerning the state of the patient's mind afforded by his letters; and the friends, being taken into the management of the case throughout, have a better understanding of their duty to the patient when his home relations are resumed."

Whether the advantages of such a system fully make up for the disadvantages may be judged after the perusal of the following cases: A gentleman discharged from the Barnwood Lunatic Asylum, Gloucester, England,[1] has complained that certain of his letters, written while an inmate of the asylum, were allowed to reach his friends, and he has thus been permitted to make a fool of himself in public in a way calculated to injure himself pecuniarily.

[2] Willard Asylum for the Insane has among its inmates a Danish lady of good education, who, previous to her insanity, occupied a respectable position in society. Her delusion is that she is immensely wealthy—the queen of the universe. On all other subjects she is relatively rational and converses with ease and fluency. She has the delusion that the asylum is her castle, built for her special benefit, and that the attendants and inmates are her servants. Recently she managed to elude the vigilance of the attendants and mail a letter to a brother in Den-

[1] British Medical Journal, March 25th, 1882.

[2] Alienist and Neurologist, 1883.

mark, stating that she had become wealthy and was living in a magnificent mansion, surrounded by luxury and attendants, and had abundance to provide for herself and family, and closed by urging him to accept her hospitality and spend the balance of his life with her. Having frequently heard of the good luck of his countrymen in the land across the sea, he did not have a suspicion but what fortune had favored his sister, and that she had actually become rich. He therefore proceeded immediately to close out his little tailoring-business, in which he had managed with difficulty to support his family, and with the proceeds purchased tickets for the transportation of his wife and five children to central New York. Allowing the letter announcing his intention of coming only a few days' start, the little family took ship for America with light hearts and great expectations. Arriving in New York, they set aside barely sufficient to take them to their destination, and spent the remainder in improving their appearance, so that they should not bring discredit upon their rich kinswoman. On reaching Ovid, they recognized Willard, from the description in the sister's letters. The cruel disappointment of the brother and his wife was pitiable. Instead of finding a wealthy sister to welcome them to her palatial abode, they found her in a hopeless condition, and an inmate of an insane asylum. Cases of this kind might be multiplied and, despite the very cogent reasoning of Dr. Cowles, demonstrate to my mind the absolute necessity for a censorship.

HOSPITAL WARDS.

Dr. J. P. Gray[1] says: "Our arrangements for taking care of the sick, though probably as good as those of any other similar institution, must be regarded as very imperfect. All sick patients should be immediately removed

[1] Report for 1882.

from the wards to a hospital department properly arranged, where every attention demanded by their condition could be bestowed: where the physician could visit them frequently during the day and in the night, if necessary, without disturbing others; where those very ill could be visited and, if advisable, nursed by their friends, and the dying be administered to without exciting the fears of others." The second annual report of the New York State Board of Charities, in referring to the Utica Hospital for the Insane, says: "There should be erected two small wards, one for each sex, for the treatment of the sick and feeble, that their friends may be able to visit them and remain near them without disturbing a large number in a general ward. This improvement is demanded, not only by humanity, but decency, especially in the case of female patients, who are frequently admitted to the asylum in a condition which justifies and demands seclusion and the most tender care." I believe that in all hospitals for the insane two hospital wards should be arranged for the male and female patients. This would prevent the disagreeable moral effects of sick people being among more or less depressed patients.

VISITATION BY FRIENDS.

I am of the opinion that no cast-iron rule can be laid down in this particular. In a general way, the results obtained have been much the same as those resulting from the similar procedures adopted by Dr. Cowles: "An experiment, which is believed to have given some special and good results, is in regard to the freedom of communication between patients and their relatives or friends, by visiting or correspondence. It is now two and a half years since my former liberal practice grew into the adoption of the present rule, for the following reasons. Few of the insane have their understandings so confused and clouded

as not to leave enough of normal mental function to conceive of the reasonableness of removing a sick person to a hospital. There is often, on the part of persons so removed, a consciousness of the propriety of this action, even in those who will not confess it. Even in cases of maniacal excitement and melancholia with stupor, we may rely upon being able to instil into the mind some degree of consciousness of the true nature of the act of removal to a hospital. When, however, we come to abruptly separate the insane person from all communication with relatives and friends, we institute a condition of things which is the more difficult to understand as the patient is more insane. The patient probably knows the usual fact, that the distance is not great from home and friends. Enforced separation and interdiction of communication beget suspicion of those friends, if it has not been entertained before, or of the physicians of the hospital. It is of the first importance not to increase or arouse this suspicion, and to convince the patient of the desire to treat him with generous fairness and indulgence. Therefore, the rule is that, from the outset, the relatives or friends shall be allowed to visit the patient. Care is taken to have it understood by all concerned that the physician will see no objection to such visiting *until the patient shall give cause for it.* This is the *rule;* but, like all rules, it has its exceptions. The patient who has an antipathy and delusion regarding relatives might not be allowed to receive visits for some time after the first one, or even the first might be denied; but it is remarkable how few patients there are who require this restriction. In this asylum, of one hundred and sixty-seven patients present, there are only three who do not receive visits from relatives quite regularly. One man with chronic mania refuses to see them because of a violent antipathy; and the relatives of two other men with mania have to refrain from visiting on their own account, but

visits are made by friends. It has been observed that, if excitement attends the first visit, which should be made early, it is as a rule no greater than attended contact with friends at the home recently left; and, in fact, this visit is regarded as a necessary part of the process of accommodating the patient to the new situation, and aids it. The first visits often have a remarkable effect in disarming the patient of fast-forming suspicions as to the purposes of friends, and help to inspire him with a salutary confidence, which aids in leading him to accept sooner the rôle of an invalid. The friends, and this term is used to include relatives, learn by these visits to render valuable aid in the management of the case, and most readily accede to the proposition that they should refrain from visiting, if it has proved not to be good for the patient. This practice stands the test of the continuance of the visits, even though, as is sometimes the case, the first ones are attended with some degree of excitement. The visits are almost invariably desired by the patient, who soon comes to understand, if need be, that they are allowed or denied according to his conduct, and thus a means is given for stimulating self-control. Sometimes, the desire to see friends can be aroused when it has been absent; and a curative result is gained by the exercise of a normal function of the mind in the gratification of the desire. In other exceptional cases, as of acute mania, or others with mental confusion or stupor, the seeing of friends may seem to give negative results, and little notice may be taken of the visitors; but, in these conditions, it is well known that impressions may still go in upon the obscured perceptions, when no outward sign is given, and are remembered. As far as moral treatment goes, in these cases of mental confusion as well as in others, efforts calculated to arouse into activity the normal elements of the mind are often of inestimable value, though no evidence of the good impressions thus made

appears till long afterward. What more potent means of arousing healthy mental action than is found in the exercise of the natural affections and emotions, and the consciousness of the occasional presence of friends whom the patient has been accustomed to love and trust?"

SCHOOL SYSTEM OF TRAINING.

It would be a serious omission not to allude to an element of psychical treatment with which I have had no personal experience, but which seems to have yielded good results in other hands. I refer to the school system which has given such good results in the hands of Dr. Lalor. Kiernan, speaking of this, says: "Blandford[1] says he has found nothing equal in intellectual patients to the study of languages, since it is intellectual without being emotional, and does not require much assistance. This is an application of one of Leuret's principles. He reports a case where a patient compelled to learn a certain number of verses by rote was cured of a tendency to repeat words and phrases. Bucknill[2] had schools in the Devon Asylum, in which patients were taught. These were attended by good results. At one time such schools were in use in the Utica Asylum when that institution was under the scientific management of Dr. Brigham.[3] On the advent of Dr. J. P. Gray, with his terrifically coarse materialistic views of insanity, these schools were abandoned, although they had previously worked well." With regard to Dr. Lalor's results in the year 1861, Dr. Gilchrist,[4] of the Dumfries Asylum, wrote that "he found educational agencies not only recognized and introduced, but conducted with so much efficiency as to surprise and

[1] Op. cit.
[2] Op. cit.
[3] Reports.
[4] Cited by Dr. Lalor, op. cit.

delight him, and that school instruction as a moral agent in the treatment of the insane, received a development in form and extent not to be witnessed in England or Scotland."

Dr. Blandford says: "I visited the Richmond Asylum, and, under the kind guidance of Dr. Lalor, inspected his celebrated schools, and was greatly struck with the spectacle presented of large classes of the inmates engaged in lessons on such subjects as geography, arithmetic, and singing. As a means not only of instructing, but in training the mind in ways of order and discipline, they must be most valuable, and in my opinion ought to be found in every large asylum."

Dr. Wilkins, of California, says: "The most thoroughly organized school that we have anywhere seen was in the Richmond Asylum at Dublin. The system has been completely established, and the organization as perfect as any schools in the country. The superintendent has taken great interest in, and paid particular attention to the subject, demonstrating not only the possibility of promoting good order and discipline by means of schools, but also of increasing the knowledge and improving the morals of persons while in a state of insanity. In the school for males we saw one hundred and twenty engaged in their recitations and exercises, which were conducted with perfect order and propriety. Reading, writing, arithmetic, object lessons, music, drawing, and painting are taught. The school for females is conducted on similar principles, though needlework is added to the list of studies in this department. Six teachers—three of either sex—are regularly employed, at salaries about double the amount paid to attendants, and, in addition to their duties as teachers, are required to assist in keeping the house in order. Some of them always accompany the patients in their walks outside the asylum walls, in the public park, and in

other places to which they are permitted to go. These teachers being better educated, more intelligent, and of a higher order than those whose services can be obtained for the ordinary wages, exercise a salutary influence over the patients at all times. Their morals, habits, and manners being thus cultivated and controlled, are necessarily improved, and we confess our surprise at having seen this kind of occupation introduced to so few of the asylums of our own country."

Dr. Hack Tuke[1] says, respecting the same school system: "The education of lunatics is no new thing. At an early period school teaching was introduced into some American asylums. Dr. Earle was foremost in this good work. Thirty years ago Dr. Brigham spoke of the great advantages which had resulted from winter classes in the State asylum, near Utica, New York. Asylum schools are also to be found on the Continent. In Scotland, Dr. Browne long ago labored to promote mental culture and literary work among his patients at Dumfries, and formed classes for drawing, Greek, Latin, etc. In England attempts have been made, but only partially successful, in the same direction. I do not, therefore, put forward Dr. Lalor's ideas in regard to the education of the insane as novel. At the same time I am not aware that in any English asylum has the regular practice of teaching been so thoroughly carried out as by Dr. Lalor. I conclude by expressing my strong conviction that the introduction of schools into all county asylums is of the greatest importance. Surely the gloomy monotony which is apt to creep into these institutions would be greatly lessened, if not prevented, by systematic instruction imparted in an able and interesting manner, and by the more frequent use of musical instruments. One great advantage of united tuition is that it brings a number of patients together, and

[1] Cited by Dr. Lalor. Report for 1878.

subjects them to a certain amount of wholesome rivalry. It excites whatever desire to excel may remain in the breast of a lunatic, arouses the sluggish faculties, and stimulates laudable feeling. The attention is diverted for at least some hours from the delusions under which the patient labors, and is concentrated upon other subjects."

Dr. Wilbur says: "I come now to speak of an institution that is unique in one of its features, namely, in the prominence given to school exercises. The head master kindly called his pupils together on the occasion of a visit I paid to the male department, and I saw some of the results of his training. Just before my visit the British Medical Association had held its annual meeting at Dublin. There was a large gathering of well-known alienists on this occasion, and they had devoted some time to the inspection of those schools. There is a complete system of instruction, with a full schedule of daily exercises, beginning with object lessons, and including the whole range of English elementary studies. Dr. Hack Tuke has given a glowing account of those schools, and an admirable summary of the results obtained. It may be mentioned in this connection that schools were a common feature in the early history of American asylums. As in the case of industrial employments, they have gradually given way to a rather exclusive drug treatment. The wisdom of the fathers of psychological medicine has become unwisdom to their professional descendants."

CONCLUSIONS.

From what has been said, it will readily be seen that the hospital for the insane is an important element in treatment and it may be concluded:

First. It should be constructed on the segregate plan with a predominance of associated dormitories. Second. The attendants should be properly chosen, properly

treated, and encouraged to take a *scientific* interest in their patients. Third. Under certain restrictions, female attendants should be placed in male wards. Fourth. Restraint should be reduced to the greatest possible minimum and prescribed strictly as a remedy. Fifth. Employment of a proper nature should be given the patient. Sixth. Furloughs may be of service, but should be given with great care. Seventh. A censorship should be kept over correspondence. Eighth. Each hospital should have two sick wards. Ninth. Visits of friends should be permitted only when beneficial to the patient. Tenth. Schools should be established as a means of employment and treatment.

RETURN OF THE PATELLAR REFLEX IN TABES DORSALIS, WITH SOME REMARKS ON THE SYPHILITIC ETIOLOGY OF THAT DISORDER.

BY

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A NUMBER of cases of return of the knee-jerk after it had been absent in a disease whose advanced stages are supposed to be characterized by its absence, have been reported by Graeme Hammond, Eulenberg, Hughes, and others. In none of them, I believe, has the return of the knee-jerk been as complete, nor the subsequent history taken so singular a course, as in the one I am about to report.

S. M., aged forty-six, consulted me at my office on May 13th, 1881; he walked with the characteristic ataxic gait, complained of frequent blurring of his vision of a diplopic character, and had true diplopia some months before. Had been under the treatment of Dr. Cypert, Dr. A. L. Loomis acting as consultant, both physicians pronouncing his disease to be "locomotor ataxia" on a syphilitic basis, and treating it accordingly. At the same time, the son of the patient was under anti-syphilitic treatment for a cerebral affection marked by an idiotic state, paralysis, ocular and hemiplegic, and complete amblyopia, from which he recovered rapidly.[1]

[1] This patient subsequently came under my treatment; the recovery from such a collection of serious symptoms of syphilitic central disease was paralleled in a Mt. Sinai Dispensary patient, Samuel G——b, *æt.* 21, the source of whose infection could not be traced. He had well-marked tertiary lesions. Within six weeks, absolute fatuity, amnesic and ataxic aphasia, right hemiplegia, and left total amblyopia disappeared under energetic mercurialization and iodide of

Examination revealed abolition of the deep reflexes, of the tickling reflex, slight diminution of cutaneous space sense on the leg, gross diminution of same on sole of foot, temperature sense normal, pressure sense slightly impaired, ability to recognize weights impaired, inability to localize impressions with eyes closed, loss of the sense of distance, but not of direction in space, gross ataxia of movement, no impairment of gross muscular power, some wasting of the gastrocnemii. There is a decided belt sensation at lower abdominal region. The pupils revealed the typical Argyll-Robertson symptom, a large coloboma oculi dextri. Ophthalmoscopic examination shows a very pale papilla. The electrical examination revealed nothing abnormal. The only symptoms on the part of the upper extremities are subjective numbness in the ulnar distribution. The patient complains of fulminating pains, particularly in the sciatic and anterior crural provinces, and has difficulty in micturition. All subjective symptoms, as well as the motor disturbance and wasting, preponderate in the left side.

Two months ago, the ataxia of movement was so great that the patient was unable to leave his bed. He has been under anti-luetic treatment since that time, administered by the physicians named. He questioned their diagnosis, and came to me to have it decided. I confirmed the opinion of Dr. Cypert, his family attendant, and referred the patient back to him for treatment. A consultation was subsequently held, in which the *modus* of administration was changed, the interrupted treatment, with large rising doses, which I suggested, being adopted.

I saw the patient frequently on the street, as he resided in my neighborhood; an improvement in his gait was early noticeable. Struck by the fact that, for the two first years, 1882 and 1883, he claimed to be entirely well, I urged him to visit me, in order that I might verify the apparent recovery by a careful examination. An inquiry being directed to me by Dr. E. C. Seguin, as to the number of cases of posterior spinal sclerosis with syphilitic accompaniment in my experience, and this patient being

potash. The "grateful patient" continued under surgical treatment of the writer at the same and another dispensary, finally passing from observation because it was declined to provide him with a plate to conceal an ulcerative and necrotic defect of the hard palate.

one of a series of forty-seven syphilitic out of a total of sixty-one cases recorded in a certain period (since Jan 1st, 1881), and being anxious to test the syphilitic etiology by the results of treatment, I made it a special point to buttonhole him one morning, June 3d, 1884, and carry out my intention. I found the pupil (left) reacting normally, the patellar reflex vigorous on both sides, being slightly less excursive in the left, all forms of sensation normal, limbs well nourished, all reflexes returned; and as gross ataxia, the Argyll-Robertson pupil, fulminating pains, bladder paresis, and abolition of the patellar reflex are generally regarded as among the most positive indications of posterior spinal sclerosis, and as these signs had disappeared after having been carefully determined to have existed, I reported the case as a cure of tabes dorsalis at the last meeting of the American Neurological Association, on the occasion when Dr. Seguin's paper (if a mere statistical array of cases seen in private practice, without a word of comment and without a single conclusion or suggestion, can properly lay claim to that title) was discussed.

Unfortunately I am compelled to modify this report; the patient complaining of dull tearing pains in the neighborhood of the knees, consulted me not quite two months after I had determined the supposed cure. He had neglected to carry out what I had repeatedly suggested to him, a carefully graded periodical anti-syphilitic course of treatment.

July 28th, 1884. Lightning-like "circular" pains running round and through both knees, worse on the left side; difficulty in voiding urine, loss of the tickling, the cremaster, and the patellar reflexes; it is impossible to elicit the latter after the most careful repeated trials. He has no belt sensation, but a feeling of tension over the hips, which he is able to relieve by pressure. There is a heavy dull pain in the lumbar region. Walking in the dark is difficult. As compared with his condition of three

years ago, his bladder disturbance is greater, his locomotor disturbance and eye trouble less, his pains as severe, while tactile sensation is now normal.

The pupil reacts to light and accommodation sluggishly in both instances. No other anomalies than those detailed found. Energetic anti-luetic treatment.

Aug. 2d. The pain in the lumbar region and the sense of pressure relieved, bladder trouble still present, but improving from day to day; the pains in the knees persist, and extend down the inner side of the left tibia. Patellar reflex and other evidences as at last examination. The patient informs me that he had an occasional "twinge" of rheumatoid pain during the winter of 1883–1884, a fact he had failed to recall at previous examinations. His memory has been much impaired during the earlier period of his ataxic trouble (1881–82), and continues so to a less extent still. He has always found that his "mind is clearer" and his general sense of well-being better while under anti-luetic treatment. As bearing on the question of his mental state, it may be remarked here that the patient had frequently experienced business reverses, involving mental anxiety and suspense. During the past two years, however, he has followed the occupation of a collector for a beer brewery—an occupation which, while it provoked no mental strain, compelled him to be much on his feet, to walk long distances, and to partake of stimulants to a degree which, under the circumstances, must be regarded as excessive.

Aug. 7th. At the last examination the patient was unable to separately extend the fingers and to bring them together singly. This is no longer the case; he is able to execute all movements in any direction with perfect freedom. The numbness previously limited to the ulnar distribution has extended beyond the middle of the middle finger; it is now felt only in the left little finger on its ulnar side, and is not constant.

It is ascertained at this examination[1] that the first fulgurating pain connected with the present relapse occurred about June 20th, that is, six or seven weeks ago. Six weeks ago, he indulged in marital intercourse for the first time since his first attack of the spinal complaint. He noted a stiffness in his jaws and the back of his neck, as well as a buzzing sound accompanied by deafness, all of which signs coincided with the orgasm, and continued till he fell asleep. His sight has improved since the last

[1] The patient's memory is responsible for many omissions similar to the above.

visit. Like all patients suffering from the same disease (in my experience), he feels immediate benefit from a hot bath,[1] while cold or cool baths, as well as cold applications and accidental exposure to cold, cause an increase in his sufferings. "On the first day I came here this time, I went home and took the warm bath you told me to take; I felt as if I could jump over a house, while before I could hardly walk two blocks, and I walked naturally over a mile afterwards."

The patient attributes the marked relief in his lumbar pain to a hemorrhoidal flux which coincided with its almost entire disappearance three days ago.

At the date of the going to press of this paper, this concludes the history.

I believe that no question can exist as to the beneficial influence of anti-luetic treatment in this case, as it is equally unquestionable that it is one of genuine posterior spinal sclerosis. I believe the disease has been progressing all these years under the mask of a remission, that remission simulating a cure, as the similar intervals of paretic dementia often do. But I also believe that a continuance of anti-luetic treatment would have prolonged the remission, if not practically rendered it a cure. The influence of this treatment has been visible from day to day sometimes, from week to week always: to the patient himself as well as to his medical attendants.

Last year I had an opportunity of witnessing another case of return of the patellar tendon reflex, which remained steadily improving, in a druggist, who presented no other symptoms of central nervous disease than slight impairment of the memory, Argyll-Robertson symptom, progressive diplopia, and abolition of the patellar reflex. After a patient use of anti-luetic measures, all these symp-

[1] I must confess to feeling not a little puzzled at the declaration of many of the Germans, repeated by some of their followers in this country, that hot baths do harm, and cold ones are to be recommended. Universally, in organic spinal disease, the experience of my patients, verified by my own observations, happens to be exactly the reverse. I forbid *all* baths as long as active symptoms of irritation are present.

toms disappeared except the pupillary paresis. The absence of the patellar reflex had been determined also by Dr. Leonard Weber, of this city. Its return was not as marked as in the other patient, but distinct, however difficult of elicitation.

Three years ago, a temporary return in a slight degree of the patellar reflex in a typical case of rapidly progressing tabes dorsalis was noted by me after its absence had been determined the week previous. The second day thereafter it was again absent. The case progressed, and terminated fatally one year and two months ago.

In a reference to my paper on "Absence of the Patellar Reflex without Ascertainable Pathological Basis," made by Sommer, of Allenberg, in Mendel's *Centralblatt*, my attention is directed to the omission of reporting on the condition of the patellar reflex in the children of the subject. I herewith supply the omission by stating that the reflexes are all entirely normal in them. The reporter cited has some doubts in his mind as to the justice of stating that there was "no pathological basis." He loses sight of the fact that I was careful to state "without *ascertainable* pathological basis." I am to this day unable to determine any pathological basis for the disappearance (authentic) of the knee-jerk, and I fear that Dr. Sommer, to whom I would have felt greatly indebted for some hint in this direction, is likewise unable to throw any light on the subject. If any can be so thrown, it must be on the strength of a more careful attention to details than was shown by the reviewer named in his reporting the patient to have diminished sexual "Potenz," whereas the reverse was reported in the paper cited by him.

It strikes me that more fruitful contributions may be made to the question of the syphilitic etiology of tabes dorsalis, by analyzing individual cases and groups of cases, than by heaping up statistics mountain high. I do not

mean by this to protest against the statistical method—with all its sources of error—but to its too exclusive pursuit. The experience of an individual observer may be of but slight relative value, but if it lead to the accumulation of evidence in a similar direction, it will effect the purpose for which it is published. It appears to me that there is a slight deviation in the degree of symptoms from typical tabes dorsalis in syphilitic cases, not in every instance, but in the group as a whole. *Early* involvement of the mental faculties, *early* wasting of muscles, particularly of the gastrocnemii, are frequent features of syphilitic, and rare ones of non-syphilitic tabes. The difference is not sufficient to justify a strong clinical demarcation, but its closer study will serve, I think, to show that syphilitic tabes is due to an intensification of a general, but, *in other parts*, slight morbid process, in the same districts of the cord which are primarily the *sole* seat of the morbid changes in non-syphilitic cases.

I have also found that there is less symmetry in the intensity of the process in syphilitic cases than in non-syphilitic ones. It may or may not be accidental, but in the majority the preponderance was on the left side.

I have had but few opportunities of examining the spinal cord post mortem, but such limited experience as I have had inclines me to believe that in non-syphilitic tabes the morbid process primarily preponderates in the nerve-tubes, while in syphilitic cases it preponderates in the connective substance. Leyden's view, that the morbid process underlying tabes is a passive and degenerative, and not an inflammatory process, is, I think, applicable to the non-syphilitic cases. I believe that non-syphilitic tabes is a degenerative, specific (luetic) tabes, an inflammatory breaking down of the posterior (and frequently the postero-lateral) columns, and that this localization is due to the less perfected nutrition of that part of the

medullary tube which, in the embryo, closed the medullary groove in the process of involution, and was latest to mature. It should be recollected by those who are inclined to follow Strumpell's ingenious, but perhaps too far-carried, theory of the localization of system diseases of the cord, that several nerve-tracts are endowed with histological peculiarities which may have no little bearing on their behavior under pathological circumstances. Thus the column of Goll may be identified in nearly its entire course by its reaction to carmine, and the pyramid tract can be distinguished from the interolivary part of the lemniscus by its color and refraction, in stained, unstained, and sometimes even in fresh specimens. All these differences are due to the varying development of vascular and connective tissues. It is true, as Strumpell claims, that the vascular supply does not account for the systemic distribution of lesions, but neither does his physiological theory cover the entire ground. Some tracts are more vulnerable, histologically, than others, and the distribution of some fascicular lesions, notably in tabes, the very instance adduced by Strumpell, seems to follow rather the line of histological and nutritional vulnerability, *i. e.*, the root-zones, with their extensive accompanying connective septa, than any special physiological law.

Wherever I have found evidences of lymphatic stasis, I have found them most marked in the posterior columns; not a surprising fact when the narrowness and depth of the posterior median fissure are contrasted with the shallowness and width of the anterior one.

As to the influence of ergot on the cord, which, as has been shown, provokes lesions like those of posterior spinal sclerosis, it is reasonable to suppose that an angiospastic state would lead to deeper disturbance in the least nourished area of the cord which happens to be its posterior segment. The true systemic degeneration of centri-

petal tracts in tabes (column of Goll) does not invalidate the position here taken. It is a late and not an early phenomenon, and secondary to the essential primary changes. It is simply the result of the cutting off of the fibre supply, from below, just as the descending degeneration of the pyramid tract in capsular hemorrhage is due, not to systemic vulnerability, but to the interruption of nervous conduction. The difference is that in the former instance the process is gradual, and insidiously destroys one basis of supply after the other, while in the latter it is sudden and simultaneous. The degeneration of the column of Goll in tabes is a true secondary, and hence a genuine systemic lesion, due, as above stated, to a loss of the nerve-fibre nutrition supply from below, through the *essential non-systemic* degeneration of the root-zones, and possibly the gray substance of the posterior corona.[1] The location of the lesions in these latter appears to me to depend on the factors above enumerated. If the interesting observations made by the Germans as to the degeneration of the mixed gray and white columns of Clarke be confirmed —and they seem to be well based and consistent—such degeneration must be interpreted as a secondary degeneration, analogous to that of the column of Goll. The suggestion I ventured to make in a paper published in the

[1] I may here refer to my tentative suggestion, made several years ago, that the explanation for the difference in the various kinds of sensation must take into account the different varieties of gray substance, such as the gelatinous substance of the *caput*, the spongy substance (in two varieties) of the *trigonum* and *cervix*, and the peculiar cell-groups in the *vesicular columns*. Certainly the differentiation of the posterior gray is in as striking a contrast with the uniformity of the antero-lateral gray as the function, mediated through the posterior nerve-roots, are multiple in kind, as contrasted with the uniformity of the functions mediated through the anterior nerve-roots. This same difference is expressed in the difference between the centripetal and centrifugal cerebro-spinal fibre-tracts. The latter, devoted to the mere transmission of impulse, are comparatively direct and continuous; the former frequently interrupted by ganglionic internodii, as if to indicate the complex co-ordinating union into which they are bound.

Chicago *Medical Review* in 1880, that the direct myelo-cerebellar tracts mediated co-ordination as to *direction* in space, and the columns of Goll (with parts of the columns of Burdach) the *cutaneous* space and pressure senses, may not be without some bearing on this latter fact. The cutaneous space sense, the power of appreciating resistance, and the sense of direction are variously affected in different cases of tabes; one indeed may be comparatively intact, while the other is almost destroyed. Some difference in the distribution of the lesion must account for it. So far as the published records go, those cases in which the columns of Clarke were found degenerated exhibited that gross ataxia which is due to a loss of the sense of direction, and as the direct myelo-cerebellar tract receives fibres from these columns, and terminates in the cerebellum, a ganglion which combines in apparent anatomical union the vestibular (?) branch of the auditory nerve and the direct myelo-cerebellar tract, that is, brings the "direction" impressions of space as space (semicircular canals) into association with those of the extremities and trunk, the observation referred to can be harmonized with the anatomico-physiological theory alluded to.

I have, as the reader will see, omitted taking into account the case of PIERRET of isolated disease of the columns of Goll. I do this advisedly, as in the light of what we know about tract disease, this case is anomalous, and because an error of observation may underlie it, as in a case to which I directed attention about two years ago at the N. Y. Neurological Society, where the normally darker shade of these columns was regarded as an evidence of incipient sclerosis.

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LOCALIZATION OF THE FUNCTIONS OF THE SPINAL CORD.

BY

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PHYSIOLOGISTS assign three different functions to the spinal cord. It acts as a centre for simple reflex actions, as a centre for complex automatic actions, and as a conductor of afferent and efferent impulses.

The distinction between reflex and automatic action is one of degree and not of kind, the automatic action (*e. g.*, micturition, defecation) being merely a complex reflex action under voluntary control. Both of these functions are assigned to the gray matter of the cord. The conduction of impulses occurs chiefly in the white columns of the cord. But inasmuch as the connection between the brain and the organs of the body is not a direct one, each sensory nerve ending in the gray matter of the cord, whence a centripetal tract issues to pass up the posterior and direct cerebellar columns, and each motor nerve arising from the gray matter of the cord in which end the centrifugal tracts from the brain, which have come down in the anterior median and lateral pyramidal columns, it is evident that even in the conduction of impulses the gray matter of the spinal cord has an important function.

It is the object of this article to locate the various functions of the gray matter of the cord at their actual levels in the organ.

To determine the location of functions of the gray matter of the cord, it will be necessary, first, to state briefly its

anatomical structure and arrangement; secondly, to review such physiological experiments as throw light upon its action; and thirdly, to consider the pathological facts derived from the study of cases of abnormal development, primary diseases, or secondary changes affecting definite areas of the gray matter. By combining the information derived from these three lines of evidence, the function of certain parts of the cord can be determined.

I.—ANATOMICAL.

The spinal cord is to be regarded as an organ formed by the union of a series of segments, each segment being made up of a mass of gray matter connected with two afferent and two efferent nerves. Such a structure is evident in the lower order of vertebrata, the appearance of the cord in snakes and fishes being that of a succession of bulbous enlargements alternating with a succession of narrow connecting bands. As the simplest form of a nervous centre consists in a reflex arc, with sensory nerve, recipient and responsive cell, and motor nerve, this segmental structure must be considered as a higher stage in the evolution of the organ. This higher stage has been attained, not only by an increase in the number of the reflex arcs, but by their union with each other, and with the higher organ, the brain. In the highest stage of all, in man, the segmental structure is no longer apparent, but is obscured by the preponderance of the connecting and associating bands which join the segments with each other, and with the brain. But even in man the segmental type may be recognized, since, although there is no constriction between adjacent segments, an evident boundary can be drawn at the interspaces between the points of entrance of the nerve-roots. Where the roots lie farthest apart the boundary is easily drawn. Where they are near together it is less evident. In the dorsal region of the cord, the

interspaces free from nerve-roots are of some extent. In the cervical and lumbar regions, these interspaces are narrow, but are still distinct. The segments of the human cord differ in size in different parts, those in the dorsal region being long (22 mm.), those in the cervical region shorter (14 mm.), those in the lumbar and sacral regions shortest (7–3 mm.);[1] this difference in length being apparently due to the fact that the cervical and lumbar segments develop longitudinally in the embryo less rapidly than do the dorsal segments, and are thus shorter, although, by developing laterally to a greater extent than do the dorsal segments, their solid bulk is actually about the same.

The segmental structure of the cord is proven not only by its external appearance in the lower vertebrata, but also by the arrangement of its gray matter. The area of the gray matter in snakes, fishes, birds, rabbits, and dogs is greater opposite the entrance of the nerve-roots than it is opposite the interspaces, and the number of nerve-cells is greater at the former situation than at the latter.[2] In the snake Luderitz found the ratio of the number of cells opposite a nerve-root to that opposite an interspace as 113 to 77, ten successive sections from each level being counted. In the rabbit the area of gray matter

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[1] Luderitz, Arch. f. Anat. und Phys., 1881. Ueber das Rückenmarksegment.

[2] Stieda: Studien über das centrale Nervensystem der Knochenfische, und der Vögel und Säugethiere. Zeitsch. f. Wissen. Zool., 1868–1869. Cord of fish, bird, and mammals.

Tiedemann, Zeitsch. f. Physiol., 1829. Cord of fish.

Carus, Arch. of Anat. and Phys., 1867. Cord of snake.

Bidder und Kupffer: Untersuchungen über die Textur des Rückenmarks, Leipzig, 1857.

Mayser, Arch. f. Psychiatrie, vii. Cord of rabbit.

Schiefferdecker, Virchow's Archiv, lxvii., p. 542. 1876. Cord of dog.

Luderitz: Ueber das Rückenmarksegment. Arch. f. Anat. u. Phys., 1881. Cord of snake, rabbit, and man.

Gegenbauer: Elements of Comparative Anatomy. Trans. by Lankaster, 1874.

opposite a nerve-root was from $\frac{1}{12}$ to $\frac{1}{5}$ greater than that opposite an interspace. In man this difference was not observed, the gray matter in adjacent segments being continuous without any visible constriction or any regular diminution in the number of cells. Every one who has examined sections of the cord in man must have noticed that the number of cells in different sections near the same level varies greatly. Van der Kolk and Clarke[1] affirm that the cells are more numerous opposite the entrance of nerve-roots. Stilling[2] denies this. Further investigations are necessary to determine the question.

The size and shape of the area of gray matter seen in horizontal section differ in almost every segment of the cord, the difference between adjacent segments being more marked in the cervical and lumbar enlargements than in the dorsal region. The shape of the gray matter in the dorsal region has been thought to resemble that of the letter H, and accordingly anatomists describe a central gray commissure between the two halves and two anterior and two posterior horns. Such a description is inapplicable to the gray matter of the enlargements where the mass of the horns is much greater than that of the central portion, and where, as already stated, the shape varies in every segment. The terms in use are, however, retained, attempts at a new nomenclature in anatomy being not only useless but also confusing.

The size and shape of the area depend upon the number of cells in the anterior and posterior horns, since the cells are the active agents in performing the functions of the gray matter. It is evident upon the most superficial examination that these cells are not scattered irregularly through the segment, but are collected into groups. But

[1] Schröder Van der Kolk: Structure of the Human Cord. Sydenham edit. L. Clarke, Philosophical Transactions, 1851, 1853, 1859. Human cord.

[2] Stilling, B.: Bau des Rückenmarks. Kassel, 1859. Cord of ox and man.

as the segmental structure of the cord is not preserved in the gray matter, it is found that these groups are not limited to definite segments. The groups of cells in one segment may be continuous with those in the adjoining segments. No one group, however, can be considered as a continuous column through the entire cord. It is true that in the posterior horns there are two groups which extend continuously through a number of successive segments, and to one of these has been given the name of the vesicular column. In the anterior horns, however, in which the cells are most numerous, a single group rarely extends through more than three segments. The majority of these groups are oval in shape, their greatest diameter being vertical, and their shortest horizontal, the latter being greater at the middle of the group than at the extremities. All the groups in one segment do not present their greatest horizontal diameters at one level in the segment; otherwise the segmental structure of the cord would be at once evident. But the various groups lying side by side have their greatest horizontal diameters at various levels, and thus may be imagined as overlapping one another, where some are thick the others are thin; so that in examining successive sections of the cord some groups will be seen to increase in size from above downward, while others are decreasing; an arrangement which is similar to that of the cranial nerve nuclei in the medulla and pons. Some groups are so large in the enlargements as to cause a projection of the gray matter at the level of their greatest horizontal diameter. It is to this cause that the variation of shape of the area of gray matter at various levels in the enlargements is due.

Cells of three varieties are found in the cord, and each variety has a definite location and different function.

1. The *small cells* are found in the posterior horns, and form a series of long groups, present at all levels, and

varying in horizontal diameter about in the ration in which the entire area of gray matter varies. It might almost be described as a column of cells were it not broken occasionally in the dorsal region.[1] The single group occupies the entire extremity of the horn. The cells in the posterior horn receive the terminations of the sensory nerve-fibres, the majority of the fibres in any one nerve-root ending in the cells of the segment which that root enters, although a few fibres from each root pass to the two adjacent segments and also to others beyond these. This fact is of importance in localizing a transverse lesion at any level in the dorsal region, since the lesion will always be found in the segment receiving the nerve in whose distribution the upper zone of anæsthesia lies.

2. *Large bipolar cells* of oval shape constitute the second variety. These are collected in the postero-internal column, which extends from the seventh cervical to the third lumbar segment. This was first described by Clarke, and has been named, after him, the column of Clarke or the vesicular column. This collection of cells lies at the junction of the posterior horn and the central gray matter on its inner border, and causes a projection of the gray matter into the column of Burdach in the dorsal region. Nerve-fibres from the posterior nerve-roots pass to these cells, and nerve-fibres issue from them to ascend the cord in the direct cerebellar column. Nothing can be affirmed regarding their function, although the hypothesis has been advanced by Ross that they govern the vegetative functions. They are never found alone diseased, and the symptoms due to their destruction in a general myelitis cannot be distinguished from the other symptoms.

3. The third variety of cells is found in the anterior horn. Here the cells are *large, polygonal,* with numerous prolongations, and a distinct axis cylinder process which

[1] Luderitz, l. c.

is continuous with a motor nerve-fibre. The cells of this variety are disposed in many groups, whose general arrangement has been already described. The special arrangement of these groups differs in every segment in the enlargements, and a statement of their position is therefore necessary.

In the *second* cervical segment (Fig. 1), three groups are to be seen: An inner group, lying at the anterior inner extremity of the horn; an antero-lateral group, lying along the antero-lateral border of the horn; and a lateral group, lying in the lateral angle or projection of the horn. These three groups extend downward through the third segment in which the first two terminate, the third group continuing into the fourth segment.

In the *fourth* cervical segment (Fig. 2), the number of groups is five: An inner group, lying along the inner border of the horn; an anterior group, lying external to this on the anterior border; a median group, lying posterior to these two, and nearer to the centre of the horn; an antero-lateral; and the lateral group from the third segment.

The extent of these groups differs. The inner group is small and long, and extends downwards through the sixth segment. The anterior group is larger but shorter, reaching downward only to the middle of the sixth segment. The median group is thicker than these, but is the shortest, ending in the upper part of the fifth segment. The antero-lateral group increases in size in the fifth and sixth segments, and its lower extremity enters the seventh segment. The lateral group becomes smaller, and at the lower part of the segment becomes continuous with a small group in the fifth segment, which lies between the antero-lateral and postero-lateral groups of that segment.

In the lower part of the *fifth* segment (Fig. 3), the inner, anterior, antero-lateral, and lateral groups already de-

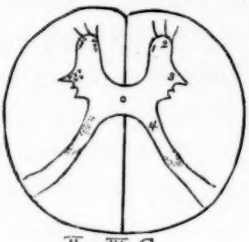
scribed are seen. In addition to these, three new groups appear: The median group, lying posterior to the inner and anterior groups; a postero-lateral group, lying in the postero-lateral angle of the horn, and projecting into the lateral column; and a central group, lying internal to the three lateral groups. The median group becomes larger as it extends downward and reaches the eighth segment. The postero-lateral also increases in size, and extends through the seventh segment. The central group is small, and extends into the upper part of the seventh segment. In some sections all these groups are distinct. In others they are so near as to be inseparable. By following a group through a series of sections its identity can be established, and it is also evident that the long diameters of the majority of the cells of a single group are parallel.

In the *sixth* cervical segment, the groups are the same as in the fifth, the antero-lateral and postero-lateral and central being much larger than the other groups.

In the *seventh* cervical segment (Fig. 4), a new inner group takes the place occupied by the inner and anterior groups above, and these groups cease. This inner group becomes larger in the eighth segment, and ends in the first dorsal segment. The median group is large, as are also the antero-lateral and postero-lateral. The lateral group between the two latter is no longer present, and the central group becomes small and ceases.

In the *eighth* cervical segment (Fig. 5) there are five groups: An inner group; a large median group; a large antero-lateral group which fills the antero-lateral projection of the horn; a small postero-lateral group; and a small central group. In this segment the posterior vesicular column begins.

In the *first* dorsal segment these groups end at various levels, with the exception of the small postero-lateral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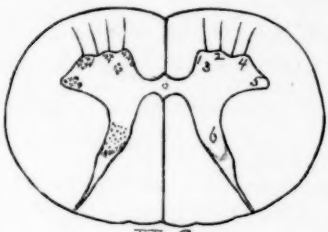
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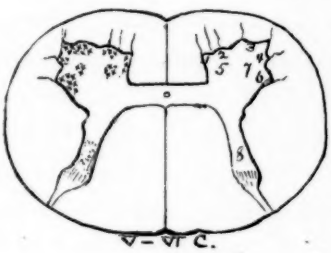
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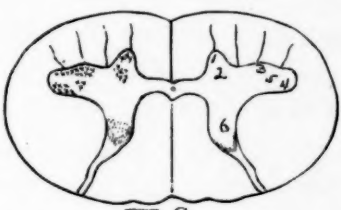
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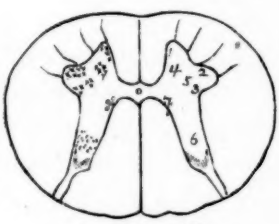
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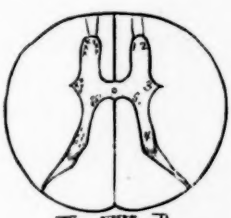
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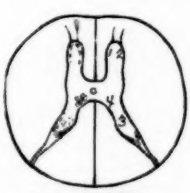
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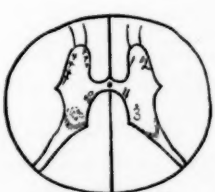
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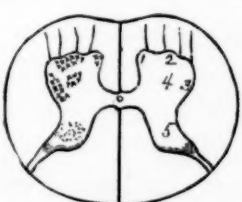
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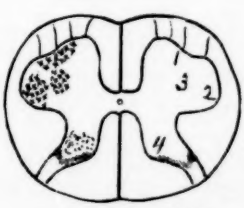
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group, which becomes continuous with the lateral group of the dorsal region. In the lower part of this segment (Fig. 6), the dorsal type which prevails down to the first lumbar segment is evident, consisting of three groups—an inner, an antero-lateral, and a lateral. The two former occupy the inner and outer parts of the anterior horn, which is here narrow; the latter is found in the lateral projection of the horn into the lateral column as low down as the tenth segment (Fig. 7). The posterior internal group is present through the dorsal region, as already described.

In the *first* lumbar segment (Fig. 8), two groups, corresponding to the groups in the dorsal anterior horn, become larger, and these extend downward into the third lumbar segment. The lateral group has disappeared.

In the *second* lumbar segment (Fig. 9), a new group is seen lying posterior to these, the upper median group. This extends to the middle of the fourth segment, where it becomes small, but then again increases in size, and reaches the third sacral segment as the lower median group. A postero-lateral group begins in the lower part of this segment.

In the *third* lumbar segment (Fig. 10), no addition to the number of groups is made, but their size is greatly increased; the antero-lateral, postero-lateral, and median groups being large, and filling the greater part of the horn. The inner group becomes smaller, and finally disappears.

In the *fourth* lumbar segment (Fig. 11), and below this as far as to the third sacral, three groups are present, one at the antero-lateral, and one at the postero-lateral angles of the horn, and one occupying its central area, and about equally distant from these two. The postero-lateral group is very large in the fifth lumbar and first sacral segments. The antero-lateral preserves about the same

size throughout. The median contains the largest cells, and in the second sacral forms the largest group.

In the *third* sacral segment, a few cells in the inner angle appear. The median group ceases. The two lateral groups begin to diminish in size. Below this point this arrangement persists to the end.

These various groups have been enumerated and distinguished because it is probable that each group is a physiological unit.[1]

Spitzka was the first to advance this opinion.[2] From a comparative study of the cell-groups of the cord, he concludes that "there is a tendency in higher animals to a differentiation of the motor-cell groups into subnuclei related to separate muscles or groups of muscles. The nearer the muscle is to the ventral aspect of an animal, the nearer will its nucleus be to the median line of the cord; and the nearer the muscle is to the dorsal aspect of the animal, the nearer will its nucleus be to the lateral cornu of the cord. Flexor nuclei are, therefore, in internal, extensor nuclei in external and posterior cell-groups. Thus the cell-group in the apex of the anterior horn as well as in the lateral cornu is fairly developed in the dorsal region, while that portion of the gray substance situated internally is deficient in cells, in evident relation to the deficiency of prevertebral muscles. To the extremities of the body, lateral extension of the cornua correspond, and in these the same relative position of flexor and extensor nuclei is probable. As is shown in the enlargements, there is much more differentiation of the cell-groups

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[1] The description of cell-groups here given is made from a comparison of the very accurate drawings and descriptions of Stilling, Goll, Erb, and Ross, and from sections made by the writer. The number of cords hitherto studied with a view to ascertain the grouping of cells is small, and this description is to be considered a provisional one. It may be the basis for further investigation.

[2] Architecture and Mechanism of the Brain. Jour. Ment. and Nerv. Dis., April, 1880.

in such extensions in the multidigitate animals than in the solipeds, as is shown by comparing the cord of man with that of the horse. Whether groups of muscles be flexor or extensor, it will be found that the nearer they are to the animal axis, the nearer will their nuclei be to the central canal. This is especially true of the flexor nuclei. The increasing development of a cell-group in the upper cervical region near the central canal in animals with powerful head and neck flexors seems to support this statement. Extensors remote from the axis, such as the trapezius, have their nuclei quite remote from the central canal."

Ross has endeavored to distinguish between groups which are fundamental and groups which are accessory. The former are common to all higher vertebrates, the latter are characteristic of special classes. An accessory function (*e. g.*, the erect position, the fine adjustment necessary to the movements of the hands) implies an accessory structure. Such a structure will be peculiar to the animal possessing the function, and in that animal will develop at a later period than the fundamental structures. Having compared the cords of man and of the ox with this law in view, Ross concludes that in man the median groups of cells in the cervical and lumbar enlargements are accessory, and also the lateral group in the dorsal region.

He connects the median group in the lower cervical region with the fine muscular adjustments which distinguish the hand of man from the anterior extremity of animals. He connects the median group in the lumbar enlargement with the motions of walking erect, which motions are mainly executed by the extensors of the leg on the thigh, by the adductors, and by the flexors of the foot on the leg; the slight elevation of the ball of the foot so as to allow the passive foot to swing forward in walk-

ing, being noticed as an adjustment peculiar to man, and acquired last by infants. To the lateral group in the dorsal region he assigns the function of maintaining the body in an erect position.

The fundamental motions he assigns to the antero-lateral and postero-lateral groups in the enlargements. The lateral group in the upper cervical region has been considered as the root of the spinal accessory nerve supplying the sterno-mastoid and trapezius. It lies very near the postero-lateral group in the lower cervical region, and is almost continuous with it in some cords. And as the deltoid, pectorales, rhomboidei, and the muscles of inspiration act to some extent together with the sterno-mastoid and trapezius, Ross assigns their centres to this postero-lateral group in the cervical enlargement. In the antero-lateral groups the coarse movements of the extremities may be located. Other movements and their muscles are represented in the other groups.

Ross holds that the size of the cells in a group is an index of the size of the muscles which the cells govern. He states that the cells of the median groups are the smallest. This is not true in the lumbar region. Other authorities regard the size of the cells rather as an index of the length of the nerves to which they give origin.

It is to be regretted that exhaustive researches in this line of investigation have not yet been undertaken, as important facts would doubtless be discovered from a study of the comparative anatomy of the cell-grouping in the spinal cord.

The arrangement of the groups of cells affords further evidence that each group is a physiological unit. As no one group is limited to a single segment of the cord, the nerve-fibres from each group must pass out in several adjacent nerve-roots. The division of a single root should therefore fail to destroy entirely the function of a single

group of cells, although it might impair the function of several groups. In like manner, destruction of the gray matter of a single segment of the cord should not destroy the function of any one group, but should impair the function of the several groups represented in that segment. Both of these suppositions have been proven to be facts by physiological experiment and pathological observation. These facts also throw light upon the reason for the existence of the brachial and lumbar plexuses. If the nerve-fibres from one group of cells are destined to reach a group of muscles with a single function, it is evident that these fibres must be selected from the various roots and be brought together into one or more nerves. Two or more groups of selected fibres from two or more groups of cells may be united in a single nerve—an arrangement which prevails in both plexuses. In this case a lesion in one group of cells in the cord will only affect a certain group of muscles supplied by a single nerve; while a lesion of the nerve will affect all the muscles supplied by it, irrespective of their distinct functions. That this is the case may be proven by contrasting the phenomena in two cases of infantile paralysis, one of the supinator longus alone, one of the extensors of the wrist alone, with a case of peripheral paralysis from injury to the musculo-spiral nerve in which both these muscles are paralyzed together. These facts will be more fully considered further on.

Granting, then, that each group of cells may have a distinct function, it is probable that groups whose functions are related lie near one another. It is well known that in any co-ordinated movement opposing muscles are brought into play together. This is best seen when one set is paralyzed, as for example, in a case of lead paralysis, where firm flexion of the hand is impossible on account of the paralysis of the extensor muscles. It is also to be expected that muscles of like function should be represented in the

same group, or that their cells should lie near together. For example, the biceps is a supinator of the forearm, as is also the supinator longus. The supinator longus is a flexor of the forearm, as are also the biceps and coracobrachialis. If allied function is an index of allied position, the groups of cells governing these muscles should lie together. As a matter of pathological fact, these muscles are usually found to be paralyzed together, while paralysis of one alone is rare, in disease of the gray matter of the cord.

It has long been known that the number of motor nerve-fibres issuing from the spinal cord is far greater than the number of fibres coming down from the brain in the motor tracts. As each motor nerve-fibre has its origin in a cell, it follows that the number of motor-cells is greater than the number of fibres in the motor tract. A voluntary impulse sent down the motor tract along a single fibre may, therefore, set in activity a number of cells. The various cells of a group are united with each other by means of their protoplasmic prolongations. It is, therefore, probable that a voluntary impulse is sent to a group of cells, and is there distributed and resolved into its necessary parts, the adjustment of the particulars of the motion occurring in the group of cells. It is not intended to limit the co-ordinating power to the groups of cells, but to imply that they govern the combined action and correlation of opposing muscles necessary to any forcible or delicate movement. The evidence for this belongs, however, to the physiological part of this article.

The anatomy of the cord indicates that its functions are performed by cells which are arranged in groups; and that these groups are more numerous in the enlargements. The anatomical arrangement points to a functional connection between the various groups in the anterior horn and the various powers possible in the extremities.

II.—PHYSIOLOGICAL.

That the anterior gray horns are motor, and the posterior gray horns are sensory, was established by Magendie and Sir Charles Bell. Experiments to determine the exact functions of the horns at various levels were not undertaken until 1880, when Ferrier and Yeo entered upon their investigations. The results reached by these physiologists are the only ones which have been announced,[1] and as the conclusions drawn from them by Ferrier[2] have received a most brilliant confirmation from recent pathological observations, they are stated here in full.

Ferrier's experiments were made upon monkeys. In these animals the anterior roots of the spinal nerves were laid bare, and each root was excited by the faradic current. It was found that the excitement of any root produced contractions in the muscles supplied by it. The contraction resulting occurred in muscles which were physiologically related, and the effect was to produce a complex co-ordinated action, with an apparent purpose, carried out by the successive contraction of a large number of muscles in combination. His experiments were numerous, and being made upon monkeys whose movements are fairly comparable to those of man, are of great value. The results are as follows, when the nerve-roots of the segments named were excited:

4 cerv. Upper arm raised upward and backward, forearm flexed and supinated, fingers extended. The hand is brought to the breast of the same side.

5 cerv. Upper arm raised inward and forward, forearm flexed and supinated, fingers and wrist extended. The hand is brought to the mouth.

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[1] Ferrier and Yeo, Proceedings of the Royal Soc. London, No. 212, p. 12.

[2] Ferrier, Brain, vol. iv., p. 223.

6 cerv. Upper arm adducted and retracted, forearm extended, wrist flexed and pronated. The palm of the hand is brought to the pubes.

7 cerv. Upper arm adducted and rotated inward and retracted, forearm extended, wrist and fingers flexed. The hand is brought against the flank. "Scalptor ani."

8 cerv. Upper arm slightly retracted, forearm extended, wrist flexed and pronated, and fist closed.

1 dors. Action of the intrinsic muscles of the hands and of the thenar and hypothenar eminences.

3 lumb. Thigh flexed, leg extended.

4 lumb. Thigh extended, leg extended, great toe pointed.

5 lumb. Thigh rotated outward, leg flexed and rotated inward, foot flexed, distal phalanges of the toes flexed.

1 sacr. Leg flexed, foot flexed, toes flexed.

2 sacr. Intrinsic muscles of the foot. Adduction and flexion of hallux, flexion of proximal, with extension of distal phalanges.

Ferrier analyzed the movements made, and has sought to locate the centres for various muscles in accordance with this analysis. He finds that each muscle is represented in more than one segment of the cord, a fact which accords with the anatomical arrangement of the groups of cells extending through two or more segments. The localization which he states is reproduced in the conclusion of this article, excepting in so far as pathological facts, since discovered, have led to modifications of his results.

No experiments have been made to determine the location at various levels of the sensory functions, although it would seem to be an easy matter to destroy the various posterior gray horns in different segments and thus determine the distribution of anæsthesiæ. The facts at present known regarding the location of the sensory cells in the

cords which receive fibres from various parts of the body have been reached from pathological observation, and will be discussed in their appropriate place.

In addition to the voluntary motor and sensory cells of the cord, there are cells which preside over reflex actions. In some cases, such as the skin and tendon reflexes, these cells are the same as the sensory and motor cells already discussed, inasmuch as the actions produced reflexly can be reproduced voluntarily.

There are, however, certain complex reflexes, those of micturition, defecation, copulation, and parturition, all of which can be performed independently of conscious perception or volition. Unfortunately no experiments have been made either by direct irritation of the cord by electric currents or by the injection of caustic substances, or by mechanical means, to determine the exact position of these centres in monkeys. Their position in other animals affords little indication of their position in man. Their position in man has been located by means of pathological observations, and will be discussed when cases of myelitis are analyzed.

Experiments performed by Goltz upon dogs prove the existence of vaso-motor centres throughout the entire length of the cord, regulating the vascular tone. That there are such centres in man is proven by a case seen by the writer in Bamberger's wards in the Vienna General Hospital, in which there was total vaso-motor paralysis with intense redness, and heat in the entire body. This case was one of general myelitis following typhoid fever. It is possible that these vaso-motor centres govern the nutrition of the skin by regulating the circulation in it, although for this function trophic centres in the cord have been supposed to exist. The trophic centres for the nerve and muscles lie in the anterior horns, as do also the trophic centres for

the bones, since disease in these parts alone may cause atrophy of these organs. The trophic cells for the skin do not lie in the anterior horns. The trophic cells for the centripetal tracts in the cord lie in the posterior gray horns, since a lesion cutting off these tracts from these cells is followed by degeneration.

Erb states that in the cervical enlargement lie centres which influence the innervation of the heart and respiratory movements. Their exact action and their definite location are unknown.

In the lower cervical and upper dorsal segments lie also centres which influence the state of the pupil, and irritation of these from any cause will produce dilatation, while their destruction produces contraction.

Goltz has shown that reflex centres regulating the movements of the digestive tract are situated in the cord of dogs at various levels, those for the stomach lying in the upper dorsal, and for the rectum in the lower lumbar regions. The existence of similar centres in man may be inferred from pathological facts. It is known that gastric diseases are associated frequently with pain between the shoulders—a symptom which is explained by supposing an irritation set up in the upper dorsal cord by the nerves coming to it from the stomach, but referred to the region to which the sensory nerves of that portion of the cord are distributed.[1] The gastric and intestinal crises of locomotor ataxia also prove that the cord has some function to perform in connection with digestion.

It is possible that the lumbar pain accompanying many uterine diseases may be explained in a similar manner as the dorsal pain in gastric disease, in which case the symptom would indicate a centre governing the uterine functions in the lower lumbar enlargement.

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[1] Hilton: Rest and Pain.

While the levels of these centres in the cord may be approximately reached by the study of pathological cases, nothing is as yet known regarding their exact position in a horizontal plane in any single segment.

III.—PATHOLOGICAL.

The most important information as to the localization of functions in the cord is to be derived from pathological cases.

1. Cases of *congenital malformation* do not give very exact results, although it is interesting to note that in a case of congenital absence of both arms and legs, no cervical or lumbar enlargements were found.[1] In an embryo born without arms, there was no cervical enlargement. In two infants born without legs, no lumbar enlargement was found in either case. In all these three cases, all other parts of the cord were normal.[2]

Troisier[3] reports the examination of the cord in an infant in whom there was a congenital absence of the right hand, there being simply a stump in the middle of the forearm. It died at the age of six months. In this case the cord was small in the lower part of the cervical enlargement on the right side. The atrophy affected chiefly the gray matter of the cord and involved both the anterior and posterior horns. The column of Burdach was the only white column at all atrophied. There was no focus of disease in the gray matter, but simply a lack of development of the cells. The anterior horn was at no place entirely destitute of cells, but the number of cells in all the groups was much reduced, so that the number

[1] Tiedemann, Zeitsch. f. Physiol., 1829, cited by Troisier, Arch. de Phys., 1872.

[2] Serres: Anat. Comparée du Cerveau, 1824, p. 106, Troisier, l. c.

[3] Trosier, l. c.

in the left anterior horn was at least three times that in the right horn, in all the sections through the atrophied portion. The segments from the fifth cervical to the first dorsal were affected. The inner group of cells was wanting at the seventh C., eighth C. and first D. The central group was wanting in the seventh C., eighth C. and first D. The antero-lateral group was largely affected at the fifth and sixth C. The postero-lateral group was less affected than any other and chiefly in the fifth and sixth C. The median group of cells was wanting throughout.

L. Edinger (*Virchow Arch.* vol. lxxxix., p. 46) reports a similar case of congenital absence of the left forearm, a stump the size of a child's fist being attached to a normal, freely movable elbow-joint. The person died at the age of fifty-two.

The ulnar, median, and radial nerves, and the anterior and posterior nerve-roots from the fifth C. to the first D. segments, were atrophied. The gray horns were atrophied on the left side of the cord, this being more evident in the anterior horn. The anterior horn was atrophied from the upper level of the fifth C. segment through the first dorsal segment, the greatest difference between the two sides being in the sixth, seventh, and eighth C. segments. There was no inflammatory process, but simply a disappearance of the cells. All the groups of cells were affected; the groups chiefly involved being the antero-lateral and postero-lateral groups, which were very small. The other groups were also atrophied, and at some levels only two or three cells were found in a section The cells remaining were atrophied, and some of them appeared like Deiter's cells, with numerous branches from a centre not resembling a ganglion cell. The anterior white columns were smaller on the left side than upon the right

Edinger concludes that the ulnar, median, and radial nerves arise from centres between the fifth C. and first D.

segments of the cord, but makes no statement regarding the functions of various cell-groups.

These cases support the assertion of Ferrier that the movements of the intrinsic muscles of the hands are governed by centres in the seventh and eighth cervical and first dorsal segments. The partial affection of the muscles on the forearm may be connected with the partial atrophy of some groups of cells in these and in adjacent segments. The statement of Ross that the groups in the centre of the horns govern the small muscles of the hand is supported by the first of these cases.

I have not been able to find any cases of congenital absence of the legs accompanied by an examination of the spinal cord. A case is reported by Ross (" Diseases of the Nervous System," ii., p. 99), in which there was congenital talipes equino-varus of both feet. The child died at the age of six months. Ross found the conus medullaris very thin and tapering. On cross section the anterior gray horns were seen to be deformed, the internal border which runs parallel to the anterior fissure being drawn outward and backward so as to be almost in a line with the anterior border of the anterior commissure. The ganglion cells of the inner group were well developed, but displaced outward. A few cells only were observed in the postero-lateral area ; and the cells of the antero-lateral and central groups were entirely absent in many sections.

2. Cases of *atrophy of the cord secondary to amputation* of a limb have been recorded by numerous observers.

The early observations of Dickinson[1] and Vulpian[2] established the fact of such atrophy without localizing it exactly in the cord.

In 1876 Hayem[3] reported an examination of the cord in a

[1] Dickinson, Jour. of Anat. and Phys., 1867, p. 88, three cases.
[2] Vulpian, Arch. de Phys., 1868–1869.
[3] G. Hayem, Bull. de la Soc. Anat., 1876, p. 231.

man whose wrist was amputated five years before his death. The corresponding anterior gray horn was atrophied, the maximum of alteration being at the level of the eighth C. and first D. segments. The atrophy was general, all the groups of cells being affected, but no section was destitute of cells. More recently he has reported another case[1] of death seven years after amputation of the right forearm just below the elbow.

In this case, the ulnar, median, and radial nerves con tained atrophied fibres, and the corresponding anterior and posterior roots were also atrophied; this change being noticed chiefly at the eighth C. and first D. roots, though the seventh C. was considerably smaller than normal, and some change was evident in the sixth and fifth roots. The white post. cols. on the side of the amputation were smaller than on the opposite side, while the ant. and lat. cols. were larger. The size of the columns was thought to be a congenital condition and independent of the atrophy. The gray substance was atrophied throughout the entire cervical enlargement on the side of the amputation, the ant. horn, being involved to a greater degree than the post. horn. The maximum of atrophy occurred in the seventh and eighth C. and first D. segments, and involved all the groups of cells about equally, there being five times as many cells in the left horn as in the right, and at places only two to three cells were found in a section. From the single drawing given, it is evident that the postero-lateral group of cells was the one least affected, all the others being involved to a considerable degree, and but one cell remaining of the median group.

Kahler and Pick[2] reported a case of amputation of the left forearm in its lower third, which was followed by an atrophy of the fifth and sixth C. nerve-roots; of the post.

[1] Arch. de Physiol., 1884, May 15th.

[2] Kahler and Pick, Arch. f. Psych., x., 3.

cols. on the left side; of the left anterior gray horn, of the fifth and sixth C segment, all the cells of the latter being involved, but the chief atrophy being located in the central and postero-lateral group of cells. They state that the seventh and eighth C. nerve-roots and segments were normal. This case, therefore, differs from those already cited, and no explanation can be offered, except that of an anomalous distribution of the nerve, since the ulnar nerve is known to arise from the eighth cervical and first dorsal segments.

In 1878, Dejerine and Mayor[1] reported the condition of the cord in a case in which, after an amputation of the thigh, the patient lived thirty years. At his death, there was found an atrophy of the anterior horn in the middle of the lumbar enlargement, extending for one centimetre (involving at least three segments). This atrophy affected all three groups of cells, but especially the anterior internal group in which only two or three cells remained in any section. The atrophy was on the side of the amputation.

Genzmer[2] reports a case of amputation of the right thigh in its lower third, thirty years before death. At the autopsy, an atrophic condition of the right anterior gray horn of the cord was found, which reached its maximum at the junction of the middle and lower thirds of the lumbar enlargement, and extended through both these h irds; the upper third of the enlargement was normal. The cells of the anterior horn were diminished in number. No mention is made of the groups of cells, but the drawings show that all the groups were involved in the atrophy. The anterior nerve-roots of the lower half of the enlargement in this case were also atrophied; but the posterior roots, posterior horns, and posterior columns

[1] Dejerine and Mayor, Comptes Rendus de la Soc. de Biol., 1878, p. 23.
[2] Genzmer, Virchow Arch, Bd. 66, p. 265.

were normal. Genzmer cites a similar case, reported by Dickson from the Transactions of the London Pathological Society, 1872, in which fifteen years after an amputation of the right leg, the right anterior gray horn was found atrophied through the entire lumbar enlargement, the cells being diminished in number, atrophied, granular, and pigmented, especially in the postero-lateral group.

Kahler and Pick report a case[1] in which they found an atrophy of the anterior gray horn in the left lumbar enlargement, at the level of the fourth and fifth lumbar segments, fifteen years after an amputation of the thigh at its lower third. The atrophy affected chiefly the lateral and median groups of cells, the inner group being normal.

In this connection the experiments of Mayser upon rabbits may be cited.[2] After section of the sciatic nerve, he found a secondary atrophy of the gray matter of the lower half of the lumbar enlargement on the side of the section, which was especially marked in the postero-lateral group of cells. He concludes that this group governs the muscles of the calf of the leg.

It is evident from these cases that important information regarding the localization of function in the cord is to be gathered from a careful examination of the spinal cord in cases of congenital absence or of amputation of limbs. Such an examination should locate the atrophy not only in certain segments of the cord, but also in certain groups of cells. It is also to be regretted that more careful investigations regarding secondary degeneration in the columns of the cord above the level of the atrophy have not been made. If atrophy of definite areas of the cortex occur after loss of one limb, it is possible that that atrophy is due to a secondary degeneration beginning in

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[1] Arch. f. Psych., x., p. 363.
[2] Arch. f. Psych., vii.

the gray matter of the cord and ascending. Further examination must determine this question.[1]

3. Cases of poliomyelitis anterior are of special value in the localization of motor functions.

Prevost and David (*Arch. de Phys.*, 1874) report a case of paralysis with atrophy of the muscles of the thenar eminence, in which an atrophy was found in the eighth C. segment 2 cm. long, extending slightly into the seventh C. segment. The groups of cells affected are not mentioned, but from the drawing it is evident that all the groups excepting the inner group were affected, a few cells remaining, however, in the postero-lateral group. This would indicate a functional connection between the median, central, and antero-lateral groups and the hand.[2]

Monakow (*Arch. für Psych.*, x., 523) reports a case of paralysis of the extensor muscles of the wrist and fingers, in which the atrophy was limited to the central group of cells in the sixth and seventh cerv. segments, the anterior and postero-lateral groups being normal.

C. Eisenlohr (*Neurolog. Centralbl.*, 1882, No. 18) reports a case of paralysis of the right arm, the pector. maj. and serrat. ant. being chiefly affected. Deltoid, pronators, and flexors of forearm weak, but not totally paralyzed; extensors of wrist and small muscles of the hand being paralyzed and atrophied. The right anterior horn was atrophied from the sixth C. to the first D. segments, all the groups being affected in the seventh and eighth C. and first dorsal segments, the postero-lateral group alone in the sixth C. seg-

[1] Pathological specimens of cords coming into the possession of practitioners, who, from a lack of the necessary apparatus (microtome. staining mixtures, etc.), are unable to prepare microscopic sections, will be received and examined for them by the writer, and mounted specimens furnished in return. Such cords should be placed in Müller's fluid as soon as removed. If put up in tin they can be forwarded by express.

[2] In this connection may be mentioned the fact discovered by Spitzka (l. c.) that in the thumbless Ateles or spider monkey the antero-lateral group of cells in the lower cervical cord is absent.

ment. The lesion was most marked at the eighth C. segment. He concludes that the pectorales, triceps, extensors of wrist and fingers lie in the seventh to eighth seg., the centres for the hand muscle in the eighth C. and first D., and other centres higher. The supinator escaped.

Sahli (*Deut. Arch. f. Klin. Med.*, xxxiii., p. 360) reports a case of paralysis of the right arm. The entire arm was weaker and smaller than the left. The interossei, thenar, hypothenar muscles of the hand and the pronator radii teres were atrophied, and lacking in reaction to electrical stimulus. The patient lived twenty-five years. The examination of the cord was very carefully made, and detailed descriptions of sections at all levels in the cervical enlargement are given. The result may be summed up as follows:—At the level of the first cerv. segment, in its lower half on the right side in the ant. horn, a small focus of sclerosis was found affecting the two lateral groups of cells. This produced no known symptoms. The chief lesion was much larger than this, and extended from the fourth C. segment to the lower quarter of the seventh C. segment in the right ant. horn. It involved the antero-lateral and postero-lateral groups for this entire distance, and the median group also below the fourth C. segment. There was also found a small focus in the left ant. horn, involving all the groups in the lower part of the fourth C., and upper part of the fifth C. segment, of which no symptoms had appeared during life. The eighth cerv. segment was perfectly normal. A second latent lesion was found on the eignth dorsal segment in the left ant. horn.

F. Schultze (*Virchow Arch.*, lxviii. p. 443) reports a case of paralysis of the muscles of the shoulder; the pect. maj., deltoid, trapez., rhomboid, and the supinator longus of the forearm being atrophied. The lesion was found in the upper part of the cerv. enlargement, and affected chiefly the lateral groups of cells, which were wholly de-

stroyed at some levels. The left ant. horn was reduced to two-thirds its normal size

Remak (*Arch. f. Psych.*, ix., p. 550), who has made a careful clinical study of anterior poliomyelitis with the view of locating the lesion,[1] has called attention to the fact that in this disease certain groups of muscles are very frequently affected together. These muscles are not supplied by any single nerve, but are muscles which act together physiologically. In the arm he describes two types of paralysis, an "upper arm type," including the deltoid, biceps, brachialis anticus, and supinator longus; and a "forearm type," including the extensors of the wrist and fingers, and the muscles of the hand. In the latter type he notices especially the escape of the supinator longus and extensores longi pollicis. He compares the latter type to the type found in lead paralysis in which the extensors of the wrist and fingers alone are involved. He also notes that the long flexors and extensors of the wrist and fingers are rarely involved together. From these facts he concludes that these physiological groups of muscles correspond to groups of nerve-cells in the cord; that a disease in the cord at a given level will not produce paralysis of the muscles supplied by any one nerve (*e. g.*, the radial), but will will produce paralysis of the muscles whose groups of cells lie at that level, muscles which together produce a certain co-ordinated movement; that the disease must involve an entire group to produce a total paralysis of the corresponding muscles, but that disease of a part of one group will cause paresis in the corresponding muscles. He concludes that the group of cells governing the supinator longus lies at an entirely different level from that supplying the long extensors of the wrist, as this is the only hypothesis upon which the independent

[1] Remak's article is founded wholly upon clinical cases. He cites no autopsies.

paralysis of these two groups can be explained. The flexor and extensor groups must also be separated. On the other hand, the groups governing the deltoid, biceps, brachialis anticus, and supinator longus must lie near together at about the same level, as must also the groups which govern the muscles affected together in the "forearm type." In support of the association of the groups of cells in the cord whose destruction produces paralysis of the upper arm type, he cites the facts discovered by Erb ("Ziemssen's Cyclo.," xi., p. 560), that a peculiar combination of paralyzed muscles arises spontaneously as well as from traumatic causes; namely, coincident paralysis of the four muscles affected in the upper arm type; and that it is possible by careful faradic excitation over a spot which corresponds to the point of emergence of the sixth cervical nerve to throw these four muscles into common contraction.

A case reported by Bernhardt (*Centlralbl. f. Nervenheilk.*, 1882, No. 15) may be cited here, as it confirms to some ex, tent a part of this statement. Bernhardt's patient was stabbed in the neck, the knife passing in at the level of the transverse processes of the fourth and fifth cervical vertebræ on the left side. He felt at once a severe pain over the outer side of the forearm, and there followed a total paralysis with atrophy of the supinator longus and a paresis of the deltoid. Some months afterwards, faradization at Erb's point failed to produce any reaction in these two muscles.

These results have been cited, although they are not based upon autopsies, because they correspond in a remarkable manner with those of Ferrier reached subsequently, and seem to establish the fact of a physiological relation between certain groups of cells and certain groups of muscles. The combination of muscles affected in infantile paralysis will be recognized by every one who has seen many of these cases.

With regard to paralyses of the lower extremity, Remak

distinguishes three types, the first in which the extensors and adductors of the leg are affected together, the sartorius muscle, however, escaping, although it is supplied by the anterior crural nerve which also supplies the extensors; a second type in which the ilio-psoas, sartorius, and flexors of the leg are affected together; and a third type in which the muscles upon the leg and foot are involved with the exception of the tibialis anticus. He notices that the last-named muscle is rarely paralyzed with the other muscles, and that when it is affected, the other muscles moving the foot frequently escape. He concludes that the groups of cells governing muscles affected together in the three types of leg paralysis lie near one another and that the group governing the sartorius lies higher in the cord than those from which the other branches of the crural nerve spring.

The following cases, in which autopsies were made, lend support to the hypothesis of Remak, although they afford little information as to the exact groups of cells involved.

Parrot and Joffroy (*Arch. de Phys.*, 1870, p. 310) report a case of paralysis of the left leg (muscles affected not stated), in which the lesion was found in the lower part of the lumbar enlargement, the ant. horn being atrophied. The atrophy affected the ant.-lat. and post.-lat. groups of cells, a few of the cells of the inner group remaining. The lesion was most marked in the lower lumbar region, but extended upward through the entire enlargement.

Kahler and Pick (*Arch. f. Psych.*, x., 539) report a case of paralysis with atrophy of the muscles of the calf of the right leg. The lesion was found on the fourth and fifth L. segments, was 16 mm. long, and involved the median group of cells chiefly, although all the groups were somewhat atrophied.

F. Schultze (*Virchow Archiv*, lxviii. and lxxii.) reports

a case in which the flexors of the thigh, the quadriceps femoris, the tib. ant., and the muscles of the calf were paralyzed on the right side; and the muscles of the calf and quadriceps femoris were paralyzed on the left side. The ant. horns on both sides of the cord in the middle of the lumbar enlargement were atrophied, the cells being reduced in number in all the groups on both sides, but more markedly upon the right side than on the left, on the right side the anterior and lateral parts of the horn were involved. On the left side the atrophy was limited to the postero-lateral part. Lower down some cells were present in all the groups, and here, too, the lesion was most marked on the right side.

Up to the present time, about forty cases of poliomyelitis anterior with microscopic examination of the cord have been reported.[1] The results of those which have not been already cited here are interesting from a pathological standpoint, but fail to give any further information regarding the localization of definite functions in the cord than that which has been already presented. The connection between the upper cervical enlargement and the muscles of the shoulder and arm, including the supinator longus; between the lower cervical enlargement and the muscles of the forearm and hand; between the middle lumbar enlargement and the muscles of the thigh and tibialis anticus; between the lower lumbar enlargement and the muscles of the leg and foot is definitely determined. What is now necessary is a careful attempt to connect various groups of cells in these parts of the cord with definite groups of muscles in these limbs. That this is possible, may be inferred from several of the cases already cited. And it is one object of this article to point out the direction in which future investigation should be made.

[1] A partial list of these will be found in Seligmüller's article on Kinderlähmung in Gerhardt's Handbh. d. Kinderkrankheiten.

The occurrence of lack of development of the bones in the limbs whose muscles are affected by infantile paralysis suggests that the trophic centres for the bones, as well as for the nerves and muscles, lie in the anterior horns. It is possible that these centres lie nearer the central canal than the motor-nerve cells (see page 476).

4. Cases of disease strictly limited to the posterior horns of a definite segment are unknown, but data are not wanting for a localization of sensory functions in the cord. It is known that, when the posterior sclerosis, characteristic of locomotor ataxia, advances from below upward to the cervical enlargement, the sensory symptoms appear first in the hands, and then extend gradually up the arm, a fact which indicates plainly that the functional relation of various parts of the cervical enlargement to the upper extremities is the same for the sensory as for motor functions.

Ross[1] cites two cases of disease involving the lower part of the cervical enlargement, in which there was anæsthesia of the inner half of the arm, forearm, and hand, two and a half fingers being affected. In one of these cases the lesion was a hematomyelia, extending from the ninth dorsal to the eighth cervical segments upon the opposite side of the cord. In the other, there was a pachymeningitis at the level of the second, first dorsal, and eighth cervical segments. Erb, in discussing the upper-arm type of paralysis of the sixth cervical root already described, states that, in two such cases, there was also a sensation of numbness in the region of distribution of the median nerve of the hand.

Ross makes the further statement that, when the sensory root of the fifth cervical nerve is involved, sensation is affected in the superior two-thirds of the anterior surface

[1] Ross: Distribution of Anæsthesia in Disease of Brachial Plexus. Brain, April, 1884.

of the arm and shoulder, and upon the entire external and posterior surface of the arm and shoulder.

The distribution of anæsthesia in the lower extremities has not been carefully studied, although some facts can be gathered from the study of cases of myelitis. These facts are included in the concluding summary of this article, and need not be stated here.

5. A remarkable group of cases of syringomyelitis has recently been collected by Fürstner (*Arch. f. Psych.*, xiv., 2), which affords evidence both of the existence of vaso-motor and trophic centres in the cord, and also of the relative location of these centres for various parts. In these cases, four in number, disease (probably gliomatous infiltration) in the gray matter of the cord was followed by disintegration and absorption, the result being the formation of empty spaces through the entire length of the cord and secondary degenerations in the posterior white columns. In one of these cases, the destruction involved the anterior horns, and the symptoms resembled to some extent those of poliomyelitis anterior subacuta. In the others, the central portion of the gray matter and the posterior horns were affected, and a total loss of the sensations of pain and temperature in the parts below, with a slight impairment of touch were present. In all the cases very marked vaso-motor and trophic disturbances were prominent symptoms. The surface was habitually cold and pale, but the slightest irritation produced an intense flush, which would extend from the point of irritation over a large area, and would remain for an hour or more. The entire body (except the face) was at times red, hot to the touch, although the heat was not perceptible to the patient, and covered with perspiration, presenting evidence of a paretic condition of all the vessels of the skin. In all the cases there were trophic disturbances of the skin, thickening, formation of bullæ, and

tendency to bed-sores, with death in all the cases from either bed-sores or acute cystitis, although in none of them was there incontinence of urine or fæces. There was also an abnormal or defective growth of the nails, and in one case a peculiar joint affection going on to ankylosis. It was also noticed that, when the disease affected the cervical portion of the cord, the pulse became very rapid and the respiration labored. The common area affected in all these cases was the gray matter just posterior and external to the central canal at all levels. Although the small number of cases hardly warrants a generalization when they are compared with others in which other parts of the cord alone were involved, without the production of these symptoms, it would seem justifiable to conclude that, in the central part of the gray matter of the cord, the vaso-motor centres and the trophic centres for the integument, finger-nails, and joints may be located.

6. Cases of transverse myelitis, from any cause, are of value in determining the level of certain functions of the cord, although they give no information regarding the relative position of the centres affected in any one section. Conclusions drawn from these cases must be carefully analyzed, however, before being accepted. It is well known that each segment of the cord is joined to adjacent and distant segments by associating fibres. In case of a lesion of any one segment, two sets of symptoms result. The first set consists of symptoms of destruction of that segment. The second set consists of symptoms of irritation in adjacent or other segments which are connected with the first by these associating fibres. Unless these two sets of symptoms can be distinguished from one another, conclusions regarding the location of the lesion are erroneous. It is possible to compare cases of transverse myelitis with cases of general myelitis, and thus to separate to some extent the symptoms of irritation from those of destruction.

The monograph of Gowers contains a summary of the results derived from the comparison of a large number of cases of myelitis. This was published in 1879. A number of cases of a similar nature have been recorded since that time,[1] but after a careful comparison of these cases with the statements of Gowers, I find but few discrepancies. The table given by Gowers has, therefore, been made use of in the summary at the end of this article, although the facts already stated warrant certain additions and slight corrections. One fact, first mentioned by F. Schultze, has been recently brought forward, which will doubtless prove of great assistance in the differential diagnosis between transverse and general myelitis and in the location of the lesion. Wherever the anterior horns of the gray matter are destroyed by the lesion, there follows an acute atrophy, accompanied by a reaction of degeneration in the paralyzed muscles connected with the segment of the cord whose anterior horns are destroyed. If, however, the anterior horns are not destroyed (and they are never destroyed below the level of the transverse myelitis), the paralysis will not necessarily be followed by acute atrophy, and the faradic reaction of the muscles will be preserved. By the same means, the upper level of a general myelitis may be determined, as all the muscles whose motor cells are destroyed will present the reaction of degeneration. Schultze found in one case[2] that the reaction of degeneration was limited to the muscles supplied by the sciatic nerves, although the patient was completely paralyzed for a time in both thighs, as well as in his legs and feet. After several months, a slight voluntary motion and some sensation returned in the thighs. The autopsy showed the lesion to have been limited to the lower and

[1] See Arch. f. Psych., xi., xiv.; Arch. de Neurol., 1881–83; Brain, 1881–83, and numerous isolated cases in French, German, and English journals.

[2] Arch. f. Psych., xiv., 2, 1883.

middle thirds of the lumbar enlargement. Here the electric examination determined the level of the lesion to be lower than the general symptoms indicated, and the autopsy confirmed the diagnosis.

The bladder and rectum are under the control of centres lying in the lumbar enlargement. Theoretically, irritation of these centres should produce retention, destruction should produce paralytic incontinence of urine and fæces, with constant discharge, and the separation of these centres from the brain by a lesion high up in the cord should produce an active incontinence, *i. e.*, a normal action of the reflex mechanism occurring without the knowledge of the patient, and not under his voluntary control. As a matter of experience, it is found that, although the law holds in some cases, in others it does not—a fact which is doubtless due to the varying intensity and direction of the irritation sent from the diseased portion of the cord to these centres. The localization of the lesion, therefore, in the upper or lower lumbar region, according as the disturbance is present in the bladder or rectal mechanism, is unreliable, and this makes the electric examination of the muscles of the lower extremity the more important in the localization of the focus of disease in the lumbar enlargement. The foot and patellar reflexes, and the skin reflexes of the foot, groin, and flank, with the approximate level of their centres, are given in the summary.

The level of the lesion in a transverse myelitis in the dorsal region can be determined by the level of the zone of anæsthesia. Each dorsal segment of the cord lies opposite the vertebra whose number is that of the dorsal segment minus one, *e. g.*, the sixth dorsal segment lies opposite the fifth dorsal vertebra. A zone of anæsthesia at the level of the fifth dorsal vertebra indicates disease of the sixth dorsal segment. In addition to the two skin reflexes governed by the dorsal cord (the abdominal; twelfth to seventh segments,

and epigastric; seventh to fourth segments), there are two muscular reflexes, one of which has but recently been discovered. The erector spinal reflex is mentioned by Ross, and consists of a local contraction of these muscles, caused by stimulation of the skin along their edge, from the angle of the scapula to the iliac crest. The hypochondrium reflex was first described by Reinhard,[1] and is considered by him a true tendon reflex. It is produced by stroking forcibly with the tips of the fingers or side of the hand the skin just beneath the free border of the ribs from before backward. There results a sudden deep inspiration from contraction of the diaphragm and a contraction of the oblique muscles of the abdomen. This is absent in locomotor ataxia. The level of the centres governing this reflex is in the lower dorsal region for the oblique muscles. If there is a direct reflex action of the diaphragm, its centres must lie in the third and fourth cervical segments, in which the phrenic nerve originates.

The facts already stated in connection with cases of local lesion in the cervical region are confirmed by cases of general myelitis in this enlargement. When the first dorsal and eighth cerv. segments are involved, the intrinsic muscles of the hand are paralyzed and atrophy, and sensation is affected in the little and ring fingers and in the inner half of the hand. As the lesion ascends, the paralysis and anæsthesia ascend the arm, the supinator longus escaping until the fifth segment is reached. Then the shoulder and chest muscles become involved with the supinator, and the outer surface of the shoulder becomes anæsthetic. As the phrenic nerve-centres lie in the fourth and third cervical segments, the patient never survives their destruction. The cardiac, respiratory, and cilio-spinal centres lying in the cervical enlargement are all affected in such an ascending myelitis, and rapid pulse, labored respi-

[1] Reinhard, Centralbl. f. Nervenheilk., 1884, No. 6.

ration with dilated pupils will precede the symptoms referable to paralysis of the diaphragm. The effect of lesions between the third cervical segment and the medulla is unknown.

If the anatomical, physiological, and pathological facts which have been collected in the various parts of this article are brought together and compared, the following clusions can be reached as to the location of the functions of the various segments of the cord.

SUMMARY.

Localization of functions in the various segments of the spinal cord.

Segment.	Muscles.	Reflexes.	Sensation.
2d–3d C.	Sterno-mast. Trapezius. Scaleni and musc. of neck Diaphragm.	 Hypochondrium (?).	Neck and back of head.
4th C.	Diaphragm. Supra and Infra Spinatus Deltoid. Biceps and Coraco-Brach. Supinator Longus. Rhomboid.	Dilatation of pupil. on irritation of neck. 4th–7th C.	Neck. Upper shoulder. Outer arm.
5th C.	Deep muscles of shoulder blade. Deltoid. Biceps and Coraco-Brach. Supinator Longus. Pectorales. Serratus Magnus. Triceps. Rhomboid. Teres minor.	Scapular. 5th C.–1st D. Elbow tendon. 5th–6th C.	Back of shoulder and arm. Outer side of arm and forearm. Ant. upper two-thirds of arm.
6th C.	Biceps Brach. Antic. Pectorales. Serratus Magnus. Triceps. Extensors of wrist and fingers. Flexors of wrist. Pronators. Supinator Brevis.	 Wrist tendons. Wrist tendons. 6th–8th C.	Outer side of arm and forearm. Inner and front of forearm.
7th C.	Triceps long head.		Inner and back of arm and forearm.

SEGMENT.	MUSCLES.	REFLEXES.	SENSATION.
	Extensors of wrist and fingers. Flexors of wrist and fingers. Pronators of wrist. Subscapular. Latissimus Dorsi. Teres major.	Palmar. 7th–8th C.	Radial distribution in the hand.
8th C.	Extensors of thumb. Flexors of wrist and fingers. Intrinsic muscles of hand.		Forearm and hand, median and ulnar distribution.
1st D.	Extensors of thumb. Intrinsic muscles of hand. Thenar and hypothenar eminences.		Ulnar distribution to hand, little finger.
2d–12th D.	Muscles of back and abdomen.	Epigastric } Skin. { 4–7 D. Abdominal } { 7–11D. Erector Spinæ muscles. Hypochondrium (?)	Skin of back and abdomen, and over upper glutal region.
1st L.	Ilio-psoas. Sartorius.	Cremasteric. 1st–3d L.	Skin over groin and front of scrotum.
2d L.	Ilio-psoas. Sartorius. Flexors of Knee, Remak (?)	Patellar tendon. 2d–4th L. Bladder and Sexual Centres. 2d–4th L.	Outer side of thigh.
3d L.	Quadriceps femoris. Adductores femoris.		Front of thigh.
4th L.	Abductores femoris. Extensores femoris. Tibialis Anticus. Peroneus Longus. Flexors of Knee, Ferrier (?)	Rectal centre. 4th L.–2d S. Gluteal. 4th–5th L	Inner side of thigh and leg to ankle.
5th L.	Outward rotators of thigh Flexors of Knee (Ferrier). Flexors and Extensors of toes. Peronei. Muscles of calf of leg.		Lower part of gluteal region. Back of thigh. Leg and foot, outer part.
1st S.	Muscles of calf of leg. Long flexor of great toe. Intrinsic muscles of foot.	Foot clonus. Achilles tendon. Plantar.	Leg and foot except inner part.
2d S.	Intrinsic muscles of foot.	Plantar.	Perineum. Anus.

Localizations of Functions in the Various Parts of one Segment of the Spinal Cord.

I. Gray Matter.

1. Anterior horn.	Inner group of cells.	Fundamental motions common to all vertebrates, *e. g.*, flexion and extension of limbs.
	Lateral groups of cells in enlargements.	
	Median group of cells.	Accessory motions peculiar to man, *e. g.*, fine movements of the hands.
	Cent'l group of cells in enlargements.	
	Motor cells of undetermined function in other regions.	
	Trophic centres for muscles and motor nerves.	
	The motor part of reflex and automatic centres.	
2. Central portion.	Ant. part. trophic centres for bones.	
	Post. part. trophic centres for skin, nails, joints, bladder, vaso-motor centres.	
	Complex automatic centres and their association fibres.	
3. Posterior horn.	Basal part; trophic centres for centripetal tracts.	
	Tract for transmission of sensations of pain and temperature from the parts below.	
	Vesicular column of cells; vegetative reflex centres (?).	

Posterior group of cells; sensations of all kinds.

The sensory part of reflex and automatic acts.

II. White Matter.

1. Ant. median col.	Motor tract from like-named hemisphere of brain.
2. Anterior col.	Association fibres between segments of the cord.
	Motor-nerve fibres between cells and roots.
3. Lateral col.	Association fibres between segments of cord.
	Vaso-motor tracts (?).
4. Postero-lateral or pyramidal col.	Motor tract from opposite hemisphere of brain.
5. External lateral or direct cerebellar col.	Vegetative tract (?).
6. Post. external col. or Col. of Burdach.	Sensory nerve-fibres between roots and cells, except those forming sensory arc of skin reflex.
	Association fibres between segments of the cord.
	Sensory tract for touch and muscular sense from the upper dorsal and cervical regions upwards.
7. Posterior median col. or Col. of Goll.	Sensory tract for touch and muscular sense from the lower dorsal, lumbar and sacral regions. The tracts from the distribution of sciatic nerves lying in the posterior median portion of the column.

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SINGULAR CASE OF VERTEBRAL DISEASE ASSOCIATED WITH A TUMOR IN THE ABDOMINAL CAVITY, MULTIPLE HEMORRHAGIC AND OTHER FOCI IN THE LIVER AND KIDNEYS, AND COMPLICATED BY COMPRESSION MYELITIS.

BY

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(Series III., 3, of Contributions from SPITZKA's Laboratory.)

THE following case appears to me to be sufficiently exceptional to merit publication, notwithstanding many lacunæ in its history and problematical features of the post-mortem findings.

The history detailed below is essentially that of a man who for many years presented an obscure history of hepatic and malarial trouble, followed by symptoms of myelitis, therewith exhibiting the physical signs of multiple tumors which were strangely misinterpreted during life, the autopsy revealing an unprecedented combination of independent vertebral disease and of distinct and separate gross tumors in the abdominal cavity and the abdominal parietes, together with multiple nodules in the liver and kidney which mostly had the character of hemorrhagic infarctions.

C. F. N., a German, æt. forty-six and one-half years, by occupation a merchant. He was a passenger on the Staten Island ferryboat "Westfield" at the time of the explosion in 1871, and but slightly injured through the accident. Had always enjoyed good health until

about two years ago (September, 1881), when he had an attack of malaria. In February, 1882, being ill again, he was told "that his liver was out of order." He, now and again, suffered from malaria (?), from which he never fully recovered. Some time during the latter part of this year, the patient went abroad, but, deriving little benefit, returned to this country. Since February, 1883, has gradually wasted away so insidiously that he was not aware of the fact until his attention had been called to it.

While recuperating among the Catskills during the summer of 1883, I saw the patient for the first time, but made no examination. He seldom left his room, and appeared only at the midday meal, being assisted to the table by his sister, his great difficulty seeming to lie in his *not* being able to rise or sit unassisted. In rising, he would first lean forward, grasp the arms of the chair, and then, by a powerful effort, slowly raise himself to the upright position. In sitting, he would grasp the arms of the chair, lean forward, and very carefully lower himself into his seat. Once in the chair, he was apparently comfortable.

On August 23d, 1883, I first examined the patient at his residence, where I obtained the following history: Twenty-five years ago, he had had a venereal sore without secondary symptoms; never contracted any other venereal disease, nor was he otherwise sick until two years ago. He suffers from anorexia, is generally costive, but now and then attacked by a slight diarrhœa, which, however, has a duration of only a few (three to six) hours. The chief blame of his illness he lays to his wife, who was very amorous, and whom "half a dozen men could not satisfy." His wife died two years previously. He complains of *no pain*, excepting a dull feeling in the small of his back. (The patient gave one the impression as if he *feared* to acknowledge pain in any locality, as if by inducing the physician to believe in the absence of pain, a more favorable view of his condition and an ultimate recovery would thereby result. One singular feature of the patient's history, from whatever view it be regarded, being the want (?) of pain.) At intervals he had suffered from severe lancinating pains, which ran down his legs, coming on at night or in the early morning, and which were always cured (?) by quinine. These attacks occurred during his stay in the Catskills.[1] He never experienced any trouble in making water but once, when it took him much longer

[1] This was an evident contradiction of the statements made at the consultations held.

to start the stream than usual. The urine contains bile. The beginning of his complaint he dates back about one year; his ameness, from his summer in the Catskills, which during his stay greatly increased, together with rapid emaciation.

The patient presents an icteric hue, which periodically becomes very marked, lasting from a few days to a week or so, and then disappearing, though not completely; it leaves him with his habitual sallow appearance. He suffers from transitory œdema of both legs, which greatly increased about a week before death, and then did not disappear. Some three or four weeks preceding death he had a ravenous appetite, which, however, lasted but a few days. His voice is husky, and he is troubled by a constant slight, hacking cough; he tells me he never had a strong vocal organ. The patient and his relatives informed me that he becomes very irritable and ugly upon the slightest cause. Before I saw the patient, he had had somewhat sleepless nights; latterly he is somnolent, but not in a true stupor, and "could sleep all the time." The patient informed me that one of his earlier physicians, examining him at the time when his gait was not as paretic as while under my observation, found that it was impossible for him to stand with his eyes closed. I failed to discover any true ataxia.

On September 26th, 1883, Dr. E. C. Spitzka saw the patient with me, and the following was noted:

On inspection, the patient appeared wasted, the intercostal spaces were sunken, and there was bulging of the epigastric and hypochondriac regions. The presence of a moderate degree of ascites was ascertained while the patient was prone. His color was sallow, rather like the dirty-yellow jaundice of cirrhosis than the golden-yellow variety, but still distinct from the cachectic appearance usually found with malignant tumor of the liver and its neighboring organs. The area of liver dulness was increased in all directions, notably in the median and mammary lines; its border *was distinctly nodular*. On turning the patient over with the intention of examining his back, a remarkable appearance was found. (Fig. 1, *a* and *b*.) An area on the left side, covering the anterior halves of the eleventh and twelfth ribs, extending forward two inches in front of the axillary line, behind to the *quadratus lumborum*, and below to within two inches of the crest of the ilium, and quite perfectly circular, was found to be raised above the surface slightly as a whole, but chiefly prominent on account of *large tortuous veins* which ramified from the centre towards the

periphery; just as in the so-called *caput medusæ* enlargement of the veins,[1] these appear to centre around the umbilicus.

The accompanying figure gives a good idea of this appearance; the surface had a partly doughy, partly elastic feel. Exactly corresponding to this area, the percussion was flat, the skin could not be moved over the (rather soft) mass (?); the tortuous veins aforementioned were subcutaneous, for they did not follow the skin. The area of flatness ceased at the edge of the surface development, and shaded off into a lesser degree of dulness towards the liver region, where flatness reappeared.

On manipulating the abdomen, a large, hard mass, of the size of a boy's head, could be distinctly palpated. This could be

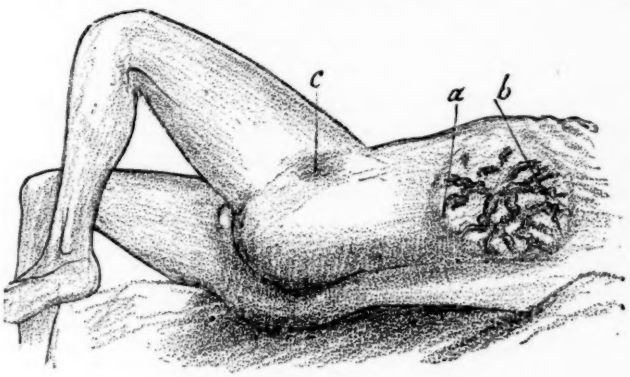

FIG. 1.
a, *b*, superficial growth; *c*, erythema.

traced to be (apparently) connected with the surface growth indicated by the large veins, and was immovable. It was not apparently connected with the liver, but the demarcation between the two could not be clearly made out.

The apex of the twelfth rib was as thin as paper, and its margins appeared eroded.

There was no anomaly discoverable on examining the vertebral line. The processes could be distinctly examined, owing to the emaciation of the patient. There was nothing in his attitude to indicate that he was constrained to keep one position, except when he attempts to turn around, which is done carefully with difficulty and some anxiety, nor did local pressure or head pres-

[1] In those cases of portal obstruction where the vein in the round ligament of the liver remains patent, the pressure is communicated to the outer abdominal veins.

sure downwards provoke pain (!). He could turn much more readily over on the left side than on the right.[1]

There is no girdle sensation. The patient hesitatingly admits having had spontaneous pains (their character is elsewhere described), and states that some time previous light contact of objects with his lower extremities, such as his clothes or hands, gave him pain. But this is not so now. His subjective complaints are chiefly limited to the state of his stomach and bowels.

The mobility of the lower extremities is feeble, and of but limited excursion, the patient being unable to overcome slight resistance, or to raise his leg from the bed more than a few inches. The toes are freely movable. All the reflexes and qualities of sensation present, but impaired as to rapidity and acuteness. Thus he is able to distinguish temperature well, to recognize the points of two needles at about twice the physiological distance, but is very uncertain, and frequently asserts that he feels three points, when but two or one are applied. The patient attempts to "show off" and the examination at this stage is rendered very difficult by this fact. He occasionally locates wrongly, attributing sensations to the right foot when the left is their seat, and *vice versa*, but in this case does not locate accurately. There is complete anæsthesia of the perineum, scrotum, and circumanal region. The cremaster reflex is normal, the solar tickling reflex is feeble and delayed. The most remarkable feature is the patellar tendon reflex. *On striking the tendon on either side* (but most beautifully marked on the left), *there is at first no response whatever*—merely the jar of concussion, *and in from two and a half to four seconds there is a powerful extension of the leg, somewhat slower in rhythm to the eye than the normal jerk, which, after an appreciable interval of between one and two seconds, is followed by another movement of the same kind, of less extent, and provided the blow were hard enough, a faint third movement would be provoked, following after a still shorter interval.* Without the watch the intervals seemed an "age," and the movements resembled the dying-out pendulum movements of a clock "running down." This singular phenomenon[2] was elicited again and again, the tapping of

[1] Which latter finally became impossible.

[2] The agency of the patient could be entirely excluded, first, because if he had had the natural condition of the reflex, he could not have prevented its appearance at the normal physiological time, and secondly, had it been absent and he desirous of imitating it, he could not have done so because his voluntary power was insufficient to have produced as extensive and powerful a movement as the first jerk was. Aside from this, the experiment had never been made before, he

the ligamentum patellæ being in all instances followed by the like result. The interval was always present.

We regarded this symptom as a delayed reflex, and suspected that some alteration of the gray substance of the cord was the cause of the impediment No electrical examination was made; the consulting physician not having had an opportunity to return from an out-of-town visit to his office for the necessary instruments. The limbs were somewhat wasted, the left much more so than the right, but owing to the œdema present, it was difficult to determine whether there was atrophy of any particular muscular group. There was an erythematous spot (commencing decubitus) over the left trochanter.[1]

It was supposed by both the consulting physician and myself that the surface enlargement was connected with the deep tumor, as the area of flatness on percussion coincided so closely with it. The partial absorption of the rib seemed to indicate a growth which had a rapid growth-rate, and a tendency to infiltration. The diagnosis was made "tumor, probably sarcomatous in character, filling the left hypochondrium, adherent to the vertebral column, causing pressure absorption of the upper lumbar vertebræ, or encroaching on the spinal canal through the intervertebral openings, with numerous foci in the liver."

This diagnosis was in many respects shown to be inaccurate on the post-mortem examination which I was fortunate enough to obtain the privilege of making, though hampered by those restrictions which so often interfere with the complete utilization of cases in private practice.

On the recommendation of the consulting physician, the patient, owing to the decubitus, was transferred to a water-bed.

The patient was very sanguine of recovery throughout; thought he had greatly improved in health and strength, and remarked that but for the swelling of his limbs he would be able to walk once again.

On making my visit, on the morning of November 7th, 1883,

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did not know its significance, and was as surprised in his way as any one at the result.

[1] Later two such appeared over the sacrum.

I found him comatose; his relatives informing me that on the previous evening he had been, as usual, very sanguine, and hoped soon to be about again. He had dismissed them at an earlier hour than usual, expressing a wish to be alone. On entering his room early this morning, they found him in this unconscious state which, continuing for about five hours thereafter, terminated in death, the respirations becoming gradually feebler and rarer towards the end.

The post-mortem examination was made in the afternoon of the same day, in the presence of Drs. Moore, Spitzka, Brill, and McGuire. Unfortunately, it was resolved to open the body in front, on the assumption that the morbid growth in the abdominal cavity was directly connected with the compression of the cord. As after removing the vertebral body, to be detailed, the extraction of the cord, either in front or behind, would have been an infraction of the condition on which I was allowed to make the autopsy, the opportunity of studying certain secondary cord changes which had possibly already taken place was lost.[1]

Only the abdominal cavity was opened. A large mass was found, apparently attached to the vertebral column, and weighing about five pounds. It measured about seven inches in its transverse diameter, which was the largest, and a little less in the others; it was irregularly spheroidal, except behind, where it was flatter. It protruded on the left side laterally beyond the coils of the small intestines, and was behind and underneath the stomach in contact with the spleen, with which organ it had no intimate connection. It could be separated from the pancreas with difficulty. The mesentery had manifold relations to it, its folds being connected with the tumor and fusing with its tissue. Behind, the mesenteric glands appeared to have been included and invaded by the growth, as it occupied their normal situation, and no trace of the larger of them could be found. Below, the tumor was in contact with the upper end of the left kidney; it nearly touched the right. It descended lower on the left than on the right side. On section, several cysts collapsed, clear serum of a yellowish color

[1] The thorax not having been opened, it was not feasible to remove the cord from in front.

flowing from them. The new growth appeared to consist of a firm basis-substance, inclosing numerous nodules; some of these were pure blood, being deep maroon-colored clots, others were of a lighter color, and a mucoid material was found in others.

There was no connection between this tumor and the surface elevation referred to as seen during life; the lateral contour of the tumor exactly corresponded to that of this surface elevation (Fig. 2, *a*). The latter was found to be a flat pancake-like mucoid mass (true myxoma on microscopic examination of the fresh specimen), apparently infiltrating the *muscular* attachments to the ribs, and subperitoneal; it had a reddish glairy appearance, and collapsed in the hardening fluid; its preservation failed. The large veins noted were situated in the infiltrated muscles and fasciæ; they were filled with lake-colored blood. No connection between them and the intraperitoneal vessels was found.

Both kidneys (the left more than the right), as well as the liver exhibited gross structural changes. Firm, apparently connective-tissue bands passed through the latter, producing a puckering of its surface here and there, but the most noticeable anomaly was the presence of numerous nodular elevations, of which the majority, on section, showed a rich maroon color, like fresh hemorrhagic infarctions; others were paler, and still others were filled with a whitish or yellowish mucoid material.[1] The nodules appeared to be composed of numerous sub-nodules and traversed by trabeculæ.

The liver was not weighed, owing to the absence of scales; it was estimated to weigh about nine pounds, being much enlarged in all lobes and in all directions. The nodules (hemorrhagic and others) were scattered quite evenly through the left and the smaller lobes; in the right lobe they were thickly crowded near the borders, and less numerous in the centre.

The kidneys had a firm consistency, in part presenting an almost fibrous texture; the nodules were less sharply defined than in the liver, but presented the same general character. The fibrous tissue was in patches which did not invade the pyramids of the kidney. The pelvis was normal in both.

Portions of the liver, the subcutaneous myxoma, the spleen, the free tumor, and the left kidney were preserved in a bichromate-of-potash solution.

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[1] The spleen, subsequently examined in the hardened state, showed two joined cavities near its border, the larger measuring two centimetres, the smaller about a third of that in diameter.

The aorta, the vena cava, and the great vessels were normal; a large artery, probably the great mesenteric, passed into the tumor with other vessels at its flat attachment to the mesentery. The condition of the thoracic duct, the ganglionated cord of the sympathetic, and other retroperitoneal organs was not ascertained.

With the establishment of the fact that healthy prevertebral tissue intervened between the lumbar vertebræ and the tumor, those present found themselves before an apparent enigma. Palpation of the vertebral column showed a slight prominence on the right side, like the projecting edge of a vertebral body. On examining carefully on all sides, the finger encountered a gap in the bony and fibrous tissue on the left side, at the upper part of the second lumbar vertebra; the bone surrounding this gap presented a carious feel, and gritty particles could be removed by simply passing the soft part of the finger over it. The tissues in front and on the sides of the vertebræ were carefully dissected away, and it was found that the prominence on the right side was due to a slight dislocation of the vertebral column; the second lumbar vertebra had slid under the first to the right about a third of a centimeter. *The entire upper edge of the* second lumbar vertebra appeared carious, being irregular, and the *intervertebral fibro-cartilage*, with the exception of a thin pellicle, adhering to the under surface of the (normal) vertebra above. There was, therefore, a deep gap between the two vertebræ (indicated in Fig. II. [of which the vertebral part is a *fac-simile*] by the black line between 1 L and 2 L).

The cavity on the left side was examined with the little finger; the vertebra, found healthy at the outer side of its body with the exception of the upper edge of the same, appeared to be a mere shell of bone, with a firm interior below and a crumbling texture above. Behind, running freely up and down in its natural situation, was the sac of the dura.

The intervertebral fibro-cartilage of the second and third lumbar vertebræ was apparently healthy. The attachment of the arches was carious, and yielded to the knife on the left, to a blow of a chisel on the right side; the division of the fibro-cartilage just referred to completed the separation of the body. The detailed description of what it revealed will be given in the sequel.

The vertebra below was entirely normal. The fibro-cartilage was reduced to a mere film behind, but the bone was nowhere denuded, nor did the disappearance of the fibro-cartilage appear to be due to anything else than maceration; its structure appeared normal wherever it was found. The vertebra above was denuded

near the anterior edge of its inferior surface for a few lines, the rest was covered by an irregular film of fibro-cartilage. Neither vertebra was further examined.

The spinal dura lay free in the bottom of the cavity made by the removal of the second lumbar body. On gently touching it, it was found collapsed, empty apparently, a reddish sanious fluid with some mucoid material and gritty particles (cancellæ) surrounded it, and was removed by careful draining up with the end of a sponge. The sac of the dura was then divided longitudinally, and opposite the centre of the (removed) vertebral body no solid contents whatever were found. There was a reddish diffluent material. Above, a portion of the cord could be identified, it was uniformly reddish, soft, and only with the greatest care could the knife be passed through it, without dissociating its frail cohesion. Below, there were several strands of nerve roots, all reddish or yellowish on section, inclosing in their middle an unrecognizable grumous material which may have been the upper part of the filum at its origin from the conus.

The division of the end was made as high up as possible in the confined limits of the space left by the removal of the vertebral body, and of the cauda equina as low down as practicable. The sac of the dura was removed with these.

An examination was made of these parts by Dr. Spitzka after they had been five hours in bichromate of potash. The tissue of the dura was normal. The roots of two spinal nerve-pairs perforated it in the lower portion, and appeared of firm texture and microscopically showed a crumbling condition of their myelin sheaths, without noticeable changes in many of the axis cylinders, while some were hypertrophied and varicose. The connective tissue was in normal proportions. Inside of the sac, the roots protruded, confounded in a mess of partly fluid, partly fascicular semi-solid strands. Several of the latter could be traced downwards, becoming rapidly firmer, and were shown in reality to be the softened upper ends of cauda-equina roots.

The contents of the middle part of the sac had disappeared, probably being dissipated in the bichromate of potash solution. The upper firmer tissue could not be manipulated. The preservative fluid brought out the contours of the gray cornua as they appear in the lower levels of the lumbar cord. The demarcation was indistinct, and the tissues were immediately transferred to alcohol, as it was evident that they could not be preserved in any other fluid.[1]

[1] The preservation failed entirely, as far as this part of the cord was concerned.

The lowest, almost fluid part exhibited molecular material, a few altered blood-corpuscles, round granular bodies, coarse granules of a refractive appearance, in short, the ordinary signs of passive myelomalacia.

The *conus terminalis* of the cord had undergone softening, leading to its conversion into a fluid pulp; the nerves running around it, and constituting the *cauda equina*, had shared the same fate. From the rather abrupt termination of the softening below—firm roots protruding upwards into the softened mass, while above, the spinal tissue was firm enough to be cut—it was assumed that the cavity of the lumbar vertebra had been the site of a tumor of a perishable nature which, growing rapidly, had caused pressure necrosis of the cord, and later, probably but a few weeks or days before death, of the cauda equina, then to undergo liquefaction itself. The irregular findings of the autopsy bear no other interpretation.

The vertebral lamina of the dura terminated in front with a ragged edge, the walls of the vertebral canal behind, on the sides, and—as far as the vertebræ in place were concerned—in front, was natural to the exploring finger; the bony arch of the removed vertebra, except at its insertion at the body, which was almost diffluent on the left side, appeared to be entirely healthy. There certainly was no indication of disease, nor was there any noticeable displacement.

A microscopical examination was made of the liver, the kidney, spleen, and the nodules in the vertebra after preservation in bichromate of potash, glycerin, and a mixture of glycerin and alcohol.[1] Sections were made in a large mi-

[1] It is the custom in the laboratory, whenever indications of the formation of mould are noted—first manifested by a slight turbidity in spots of the surface part of the fluid—to pour the preservative solution away, and replace it by glycerin. The latter proves fatal to all fungoid or other parasitic development. After the specimens are thoroughly permeated by glycerin, which is made evident by their sinking, change in color, and transparency in thin portions, the hardening in a fresh solution of the original fluid may be resumed.

crotome, and stained with aniline dyes, carmine, and hæmatoxylin. An examination of the abdominal tumor in the recent state showed it to be a fibro-sarcoma, with myxomatous foci and numerous hemorrhagic foci. There were also a number of cysts filled with a serous fluid, which showed no special characteristics.

A microscopic section from near the middle of the liver showed the following:—In many cases, the masses had enlarged so uniformly with those in the neighboring lobules that the liver cells remaining were reduced to a mere lining one or two cells thick. In some areas, particularly in a specimen from the left lobe, this remarkable process had reached such a degree that areas of the liver measuring an inch in either direction presented a thin meshwork of attenuated but quite healthy liver tissue, within whose meshes the masses were imbedded. These varied in size from a group equivalent to half a dozen cells to an inch; but in the larger ones a sort of lobulation was produced by the remaining of some liver-tissue septa at the periphery. A striking feature was the healthful appearance of most of the liver cells throughout and under all reagents. Only in a few places neighboring on large nodules could numbers of lightly-stained bodies, having the polygonal shape of liver cells, but without nuclei and of hyaline appearance be seen, which were interpreted as defectively nourished liver elements. This latter appearance was found at several points throughout the liver, and where it is most marked, large fat globules could be found scattered through the masses in large numbers and groups. A few of these globules were found in all the larger nodules. At a few points liver cells could be seen whose nuclei were well stained, but whose outline was roundish, while the protoplasm was not stained at all, either by carmine or hæmatoxylin. They occupied a layer intermediate to the normally stained and shaped liver cells on the one hand, and the rounded polygonal clear elements previously alluded to as probably degenerated liver elements. Nowhere did this process appear to me as being a typical fatty degeneration, it appeared rather as a simple deterioration of the protoplasmic contents.

Near the edge of the liver, there were found bridges of healthy liver cells surrounding the interlobular vessels as described elsewhere. Surrounding transparent areas, which under a high power (500 diam.) were found to consist of connective-tissue septa and cell outlined corresponding to that of the bodies elsewhere

referred to as defunct liver cells. In one of these patches, a number of the round cells characterizing the neoplasm in the abdominal cavity were found filling the (apparently) empty cell capsules. From this it was inferred that the whole space had been entirely filled with these originally, but that owing to unfavorable circumstances their growth had been checked.

The smallest masses consisted of round, glistening elements, which took neither carmine nor hæmatoxylin staining well. Some of them had a fine halo, and appeared to be connected with delicate processes. In some of the larger masses, many of which showed a reddish color in the recent state, nothing but blood-globules were found crowded in large numbers, and in others besides groups of hæmatosin granules.

Powerful strands of connective tissue passed through the liver substance at various points. At one point regularly disposed spindle cells were found scattered among the fibres. But most of these septa consisted of irregularly wavy connective-tissue bundles, with rows of cells slightly larger than those described as constituting the smaller nodules scattered among them, and here and there with rows and masses of blood-corpuscles, which notwithstanding the method of preservation had retained their characteristic features.

A section from the upper third of the kidney showed the following :—Carmine specimen. (Power of 25 diam.) Morbid changes most marked at the periphery of the kidney. Here, an area equivalent to a triangle measuring one and three-quarter inches at its base, and one and one-half inch along each of the other sides, the apex of the triangle, corresponding to the outer edge of the kidney, presents a deep red stain. Several lighter nodules are noticed in this red mass, which in some places are closely crowded, and separated by septa of the deeply stained substance. The connective-tissue new formation consisted of numerous fibres, which stained diffusely in carmine, and small cellular elements which stained deeply in hæmatoxylin, resembled the nuclei of capillaries, and were in some places crowded into distinct accumulations. The new formation contained numerous cysts which in the recent state contained, some of them serum, some of them

blood coagula, and most of them a hyaline material which was deeply stained in carmine, and took a slight brownish tinge in hæmatoxylin. It contained also numerous blood-vessels with very delicate walls, some of them appearing as mere vascular gaps.

Many of the Malpighian capsules appeared immensely hypertrophied, three or four times as large as the normal.

Under a moderate power (100 diam.), hæmatoxylin specimens showed what were apparently proliferations of nuclei in the walls of the blood-vessels of the Malpighian coils. These, however, bore no resemblance to the pathological elements. In one field, the place of the Malpighian body was filled by granular matter, some brownish pigment, all apparently imbedded in a hyaline mass absorbing carmine.

Near the centre of the kidney the relation of normal and pathological tissue was different from that above described. The healthy tissue surrounding the abnormal masses, and on a more careful examination a condition which first puzzled us was found to be exceptional, and due to the capping off of healthy areas protruding into the diseased area in the sections. The hyaline and granular degenerations of the interior of the Malpighian capsules above adverted to was accompanied by the development of compact connective tissue. Probably the numerous gaps in the latter marked the site of Malpighian bodies and tubules, whose normal structure had disappeared.

The blood-vessels of the kidney were injected, and many of the cystic cavities were filled with blood-corpuscles. The intestinal tract presenting nothing abnormal.

The body of the lumbar vertebra showed the following:

Anterior face normal; the ordinary ligamentous investments. The upper face presented a rough, carious appearance. The

lower face, as far as it existed, showed the intervertebral cartilage in its normal relations and appearance.

Of the posterior face of the vertebra, only an area measuring half an inch in height by from three-quarters to a whole inch in width was present; more than one-half of the substance of the vertebra had disappeared. In fact, the anterior wall of the vertebra and the upper eroded face, which corresponded nearly to the normal extent with the lower face which occupied about two-thirds of the normal extent, constituted a mere shell of bone around a cavity which had destroyed its interior. The upper eroded face, on whose posterior contour the above-described sole remnant of the posterior face of the body was found, roofed over the necrotic cavity, while the inferior shell thinned down to nothing posteriorly. It was at first intended to decalcify the vertebra and make a section of the whole; this failed, and an examination of those parts which were sufficiently decalcified, as well as of several soft, roundish masses found in the interior, showed that there was a diffuse infiltration of a material composed of roundish cells. The erosion on the upper face of the vertebra encroached more on the anterior face than on the posterior, where a little speck of the fibro-cartilaginous surface was still intact. The hollow surface was smooth, and several septa were indicated on it, as if nodules had formed separately, had broken through the separating septa and fused, and then disappeared (as was evident from the recent appearances). The bone surrounding this portion of the excavation was much more compact than is normally the case.[1] The cartilage on the inferior surface showed nothing abnormal, as far as it was present in the specimen.

There are, as the reader will see, many unexplained features in this case. The occurrence of multiple infarctions in the liver[2] and kidneys without any of the conditions ordinarily underlying these formations is a singular and, as far as I can learn, an isolated observation. In determining the cause of the spinal compression, we are reduced to theorization, notwithstanding the pronounced

[1] Where the cancellated tissue is under normal circumstances "wide-meshed," the bony boundary of the cavity was as compact as the tissue of the outer surface of the clavicle or the scapula.

[2] There were no recent infarctions in the spleen, nor any traces of such unless the two cavities referred to, which were exposed in making microscopic section, represented the site of former ones.

character of the lesions. The sac of the spinal dura ran freely in a cavity filled with a sanious fluid—possibly the result of the breaking-down of the vertebral body in front of it. That the vertebra in question was the seat of a sarcomatous degeneration was established by the microscopic examination of the soft nodules in the interior of what remained of it. The compression can only be explained on the assumption of a large (myxomatous?) nodule or a cystic degeneration, which rapidly underwent absorption, after having destroyed the lower part of the conus terminalis and the upper part of the cauda equina. The loose fragments of cancellated tissue found in the spinal canal, in the excavation of the vertebra, and in the opening of communication with the abdominal cavity, point to a rapid disintegration, while the firm texture of the bone lining a part of the cavity points to either the compressing action of a previous cyst or to some hyperplastic reaction.

The symptoms as observed to within a few weeks before death point to incomplete compression of the cauda equina, with possible involvement of the gray matter. It is scarcely to be assumed that the intervertebral fibro-cartilage could have already been affected to the degree found at the post mortem, at the time when the patient could turn around in bed and sit up for the purpose of undergoing a lengthy examination. The bodies separated by the necrosis of this cartilage *retained the mutual distance from each other which represented the thickness of the disappeared fibro-cartilage*—a condition scarcely compatible with an early occurrence of the change, unless we assume that the connections of the vertebral arches are sufficient to maintain the superimposed weight of half the body, in a person loaded with tumors, enlarged abdominal organs, ascites, and with weakened muscles.

A curious error in diagnosis occurred in consequence of

the superposition of a flat tumor in the abdominal walls on the deeper growth, a relation which is indicated in the accompanying diagram.[3]

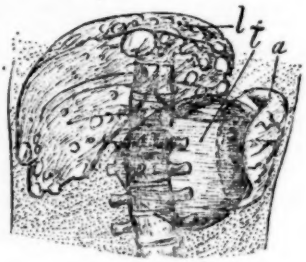

FIG. 2.

An explanation cannot be offered for all of the symptoms of spinal compression. The paraplegiform symptoms were evidently due to compression of the *cauda equina*, the slight involvement of the bladder up to within a short period before death would seem to indicate that the lower root origins with the lumbar cord must have been affected very recently before death. It is probable that the retarded patellar tendon reflex and its singular pendulum-like repetition, were due to compression of the nerve-roots, and not to a change in the gray substance. Erb has recently shown that affections of the peripheral nerves lead to impaired conduction, and what is true of the nerves outside of the spinal cord, is probably true of those within it. The imperfect examination of the cord is much to be regretted.

After a tedious examination of the literature of the subject, I have been able to find but very few cases whose progress and symptoms approximated those of my patient. In order that those who may chance to have an opportunity to supplement the present case-record with more

[3] Transparent representation of the liver, the new formations and the vertebral relations. 12 *D*, 12th dorsal vertebra. 1 *L* and 2 *L*, the first and second lumbar, with the intervening hiatus. *l*, the nodulated liver; *t*, the deep tumor; *a*, the superficial veined myxoma.

complete observations, may have their labor lightened to some extent, as regards the collation of similar ones, I herewith add a brief summary of the more important. The first related resembles mine in the early predominance of liver symptoms.

I.—*Slow Compression of the Spinal Cord.* At a meeting of the Cambridge Medical Society,[1] held on October 5th, 1883, Mr. Laurence Humphrey narrated a case of "Slow Compression of the Spinal Cord," occurring in a gentleman, æt. seventy-two, active for his age, and engaged at his profession until his last illness. He had been under the care of Mr. Carter, of Cambridge, for many years, during which he was liable at times to some gastric troubles and pain after food, but was in moderately good health until June, 1882, when his first symptoms began. His family history showed a tendency to gout, and his sister died of cancer of the breast. In June, the patient first began to complain of occasional pain in his back, and his friends noticed that he stooped more than usual. In October, he went to London and consulted a physician, and the opinion formed was that the liver was at fault. The pain, however, became worse, and there was found to be an obtuse bend in the lower dorsal region of the spine, with projections of the spines of the five lower dorsal vertebræ; here there was also some tenderness on pressure. The seat of the pain, however, was somewhat lower down, in the lumbar region. In December, there began to be some alteration in the character of the pain in the back. In addition to the constant aching, he was seized with paroxysms of a peculiar kind, coming on usually at night or in the early morning, in spasms of the most severe pain in the stomach and loins, quite unbearable, and causing him to cry out and his back to become rigid, and then leaving him pale, exhausted, and covered with profuse perspiration, to return again after an interval. Up to this time there was no sign of paralysis, and sensation was normal; but the pain extended down the legs and across the abdomen, as if the nerve-trunks were in some way irritated. He was seen in consultation with Dr. Paget from time to time, and in December, Dr. Bristow was also called in, and the question raised of a new growth involving the spine and nerves. At the end of December, the painful symptoms abated considerably, though not entirely, and he got up and walked about, and even went out of doors. The bowels were very confined, there was a

[1] London Lancet, May, 1884, p. 384 (American Reprint).

constant feeling of sickness with a troublesome secretion of sticky mucus about the fauces. Now for the first time he noticed some weakness in his lower limbs, and his gait became uncertain and unsteady. These latter symptoms increased very rapidly, so that in a few days he was unable to walk or turn himself over in bed. He was placed on a water-bed, and there was no particular change in his condition for some weeks. In February, a moxa was made on either side of the spine in the region of the obtuse bend, which was now very evident. There was some relief from the constant pain, but the paralysis became more complete and the muscles soft and flabby. Sensation began now to be impaired and reflex action was slightly exaggerated, there was also considerable retardation of sensation, so that as long as from twenty-five to forty seconds elapsed before a stimulus applied to the leg was acknowledged as felt. In other parts of the body sensation was natural. He was unable now to retain his motions if relaxed, and passed them under him. The bladder was not affected till late on in March, when one morning he was unable to pass his water, and had to be relieved by the catheter. He was provided with a soft india-rubber instrument, which he used three times a day for nearly four months, without any discomfort or cystitis. A fortnight before his death, the sphincter became paralyzed, and the urine dribbled constantly away. There was no great tendency to bedsores. Emaciation was considerable, but cancerous cachexia was not a marked feature. His mind was perfectly clear to the last, and he was able to transact some legal business not very long before his death. He became gradually weaker, and died on July 1st.

The post-mortem examination revealed a sarcoma occupying the middle and lower dorsal region of the spine, and extending in and amongst the muscles of the back. On section the bodies and spines of the vertebræ were found softened and invaded by the new growth. The body of the tenth being crushed in, had given way, so that the spinal canal at this part was much narrowed, and the cord tightly nipped just above the lumbar enlargement. The growth had not attacked the meninges or nervous structure. There was no evidence of malignant disease elsewhere.

Dr. Hünicken[1] relates the following case which, from its higher location, gave more positive spinal symptoms.

II.—*Cellular Sarcomatous Growth in the Tenth and Eleventh Dorsal Vertebræ.* The patient was first seen by him on Septem-

[1] Berliner Klinische Wochenschrift, No. 26.

ber 2d, 1876, and was now twenty-four years old. At the age of nine years the patient presented a tumor over the left mastoid process, which during the next three years slowly increased in size, and was removed. Up to July, 1876, had had no pain in the back. In August, she was first attacked, in descending a hill, by a sharp and severe pain in the back, which after resting diminished in severity, but immediately returned upon resuming her walk. The patient when seen by Dr. Hünicken was poorly nourished and delicate. She now complained of weakness in the lower extremities and a sharp pain in the back. The patient could not walk but with the assistance of others. Bowels confined. The pains came on at night, were cramp-like, and so severe for hours as to cause her to cry out. At the end of October she presented the following conditions: Paraplegia, and palsy first of the bladder, then of the rectum. At the same time anæsthesia of the lower extremities, though not complete. Reflexes diminished. Was thought to be suffering from hysterical palsy, but the symptoms becoming worse, compression was thought of, myelitis being excluded for want of fever. The symptoms during the three or four months were not unlike vertebral fracture. The diagnosis of a tumor about the twelfth dorsal vertebra compressing the cord was made. Toward the end of November, mortification of the integument, first of the labium majus, later of the nates, set in. After seven months' illness from the commencement of the spinal symptoms, patient died.

The autopsy revealed a sarcomatous tumor at the tenth and eleventh dorsal vertebræ. The medulla between the tumor and the posterior wall of the vertebræ was flatly compressed. The membranes of the same were intact. The tumor itself was encircled by a cyst-like, adherent, fragile membrane.

The location, though not the character of the cauda equina trouble in the following case is interesting in connection with my own.

III.—*Carcinoma of the Cauda Equina.* Dr. R. G. Alexander[1] mentions the case of Emma E., at the Bradford Infirmary, who had pain in the course of the sciatic nerve, which after a time disappeared, but to return again. The pain increased in intensity. Bowels confined. On examination a tumor was felt occupying a space to the left and below the umbilicus. The patient rapidly lost flesh, and after about a year's illness, died.

[1] London Lancet, Mar. 4th, 1876, p. 348.

In some respects the semeiology of the following case resembles my own.

IV.—*Vertebral Caries, Paraplegia and Recovery.* In this case[1] the patient at first complained of a pain in the back. Palsy, coming on slowly, first of the right and later of the left leg, followed. A band-like feeling over the chest and abdomen was also observed. This was followed by complete paralysis of the lower extremities, wasting of the muscles, and complete anæsthesia of the affected limbs, and muscular cramps. Sensation was subnormal. The patient recovered. Diagnosis, traumatic kyphosis with secondary chronic myelitis and spinal meningitis.

The complication of intra-abdominal and vertebral neoplasms is the main feature of resemblance in the following:

V.—*Alveolar Cancer of the Vertebræ Involving the Cord; Medullary Tumors in the Abdominal Cavity.* The patient,[2] a man æt. thirty-eight, complained of pain four months before his admission, Apr. 6th, 1874, in the iliac fossa and hypochondriac region, which would increase on making movements, especially on getting up after sitting. At the same time he had emesis and diarrhœa. After the pain had diminished from the use of salt baths, palsy of the legs, motor and sensory, came on suddenly after the fourth bath, with involuntary evacuation of fæces and urine. Œdema of the lower extremities and coxitis appeared at the same time with fever, rigors, decubitus. On examination, a tumor was felt in the abdomen.

Autopsy (May 21st, 1874) revealed three egg-sized medullary tumors in the abdominal cavity, one of which had completely destroyed the tenth dorsal vertebra and implicated the cord. The tumor was an alveolar cancer. Macroscopically no trace of a neoplasm was found in the cord. Microscopically also, the posterior columns were seen to be softened.

As regards the character of the vertebral involvement, the following, aside from its thoroughness in detail, merits being quoted:

VI.—*Vertebral Caries and Ensuing Degeneration of the Cord.* H. Geist,[3] mason, fifty-eight years of age, complained of a backache for the last thirteen years. During the last half-year there was a burning sensation in both hypochondriac regions, which disap-

[1] Schmidt's Jahrbücher, Vol. 123, p. 166.

[2] Schmidt's Jahrbücher, 1876, Vol. 171, p. 141.

[3] Quoted by Dr. C. Frommann in Virchow's Archiv, Band 54, pp. 42–62.

peared after having lasted nine months. The burning sensation was attended by persistent pain in the lumbar vertebræ radiating towards both sides, and also by periodical pain in the abdomen, and vomiting. Loss of power in his legs came on slowly and gradually, and his gait became uncertain and unsteady. In walking, his legs were dragged after him. Four weeks ago, there came on complete paralysis of the lower extremities. The abdominal pain increased during the last week, the legs on touch felt cool, and a vexatious "creeping" sensation in the legs made its appearance, starting from the toes and extending to the knees, then hip and abdomen, at first with hours of intermission, but later with only fifteen minutes' intermissions. The pain lasted continually. From now on, he often suffered periodically from cramps in the palsied muscles, especially in the ham. During the last weeks his abdomen feels as if inclosed in a girdle. He frequently suffers vesical pain, he sometimes has involuntary passage of urine, and between these attacks he urinates voluntarily and without pain. In the last days only he always passes fæces and urine involuntarily. Motion in the upper and lower extremities nil, and in the lower contracted. Sensation in the upper extremities diminished or lost. Pressure on or pinching of the feet and legs is not felt; in the upper extremities sensation is diminished. On pricking the skin of the foot and legs, only weak reflex movements were excited. On irritating the foot, an almost constant bending of the leg took place.

Autopsy revealed: the dura mater of the cord, on the posterior surface of the body of the eighth dorsal vertebra, thickened and adherent to the bone. The bone substance in the vertebra absent, and on section revealed a pus-cavity, containing thick, cheesy matter and pieces of bone, almost taking in the whole body of the vertebra. The caries extended upwards into the substance of the seventh and sixth dorsal vertebræ, which contained partly watery pus and partly infiltrated bone substance. The left eighth rib was also carious, and the intercostal nerves in the vicinity of the diseased vertebræ were imbedded in thickened callous tissue. Above and below the thickened locality, the dura was normal, as was also the pia mater (macroscopically). The cord, on the other hand, in the vicinity of the thickened dura, was compromised and smaller above and below, and it appeared as if the whole area above and below was marked by a constriction. The consistence of the cord was nowhere diminished, if anything, rather increased. The gray substance, from the lumbar enlargement to the diseased

locality, had a rust-brown color, which here and there affected more either the anterior or the posterior cornua. Towards the carious locality, the color of the gray substance was diminished, but above it again increased in intensity. From the upper portion of the dorsal region to the middle of the cervical enlargement, the columns of Goll presented a pale or purplish gray tint, while the rest of the diseased cord was scarcely if at all discolored. In the lateral columns yellowish streaks were seen extending from the periphery to the gray substance; yellowish spots were seen in the posterior columns, especially within the constricted portion. The spinal as well as the neighboring sympathetic ganglia, between the diseased vertebræ, were inclosed in a thickened fibrous tissue, swollen, and on section presented a partly reddish and partly yellowish tint.

Microscopical examination showed the process to be of greater extent than macroscopically, and to be a grayish degeneration.

VII.—At a meeting of the Midland Medical Society of March 5th, 1884,[1] Dr. Barling showed a specimen of caries necrotica of the second lumbar vertebra, taken from a male, aged twenty-six, who had been under observation for five years, during most of which time a psoas abscess had been discharging in the usual situation. The remarkable points about the specimen were, that the posterior part of the body of the vertebra was affected; that the sequestrum was of considerable size; and that the abscess arising from it communicated with the interior of the spinal canal, but produced no symptoms. There was no history of injury or of syphilis. The patient died of amyloid disease.

Evidently a careful recording of all observed cases, and equally careful utilization of the material accumulated in our hospitals, are destined to reveal facts, altogether out of accord with the currently accepted notions of the symptomatology of spinal compression and of the gravity of disease affecting the posterior part of the vertebral bodies.

AUGUST 15TH, 1884.
NEW YORK, 215 EAST 19TH STREET.

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[1] It was reported in the British Medical Journal for March 22d, 1884.

THE MEDICO-LEGAL SIGNIFICANCE OF HEMI ANÆSTHESIA AFTER CONCUSSION ACCIDENTS.

BY

JAMES J. PUTNAM, M.D.

WITHIN the past two years a number of cases have come to the writer's notice in which concussion accidents, such as falls, railway collisions, and the like, have given rise, even in male subjects, to impairment of the sensibility, general and special, of one side of the body (sometimes to a less degree of the other also), and it has twice happened that these symptoms have furnished valuable evidence against the probability of malingering, where claims had been made for damages.

The medical expert is rarely called on to the witness-stand under more annoying circumstances than when required to testify as to the real condition of a patient who claims to be suffering from the effects of a railway collision or similar accident, yet who presents no sign of disease that might not be ascribed to simulation. Under these circumstances, anything of the nature of objective signs of disease is heartily welcome, and the symptoms to which I have referred, though not strictly objective, yet possess almost the same degree of significance.

There is nothing in a hemianæsthesia, especially if incomplete, to appeal to the imagination or sympathy of a jury, and in its typical forms, at least, its simulation would imply an amount of knowledge and skill that none but the best professional cheats would be likely to possess.

Three of the five patients whose cases form the basis of this paper were not making any claim for damages, and had no motive whatever for deceit. The discovery of the hemianæsthesia was apparently an entire surprise to all.

Within the past year, a careful examination has been made by Thomsen and Oppenheim[1] of the sensibility both of the skin and of the eye and ear, after epileptic attacks and a variety of other nervous outbreaks, as well as in conditions of permanent nervous disorder.

In certain groups of these affections, impairment of the sensitive functions was regularly found, especially a concentric narrowing of the field of vision. The impairment was generally bilateral, but often most marked upon one side.

Dr. G. L. Walton reported, in the Boston *Med. and Surg. Journ.* for Oct. 11th, 1883, a very interesting though complicated case of functional (in some respects also organic) impairment of sensibility of all kinds after concussion from the explosion of a shell.

Similar conditions have, of course, frequently been noticed with the other sex as a result of shocks of various kinds, and it is also well known that the general hysterical state, as well as a variety of marked hysterical symptoms, may make their appearance under like circumstances in men. A number of striking cases of this class are reported by Page ("Injuries of the Spine," etc.), who has also done good service in supporting the opinion that the condition known as railway spine and the like is, in the great majority of cases, a functional neurotic disorder, and not a result of organic spinal disease.

The object of the present paper is to call attention to the importance of seeking for these symptoms of complete

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[1] Arch. für Psychiatrie u. Nervenkr., 1884, xv., 2. Centralbl. für die med. Wissensch., 1884.

or partial hemianæsthesia (in men) after all other signs of disease have passed away.

As Thomsen and Oppenheim point out with regard to their own cases, it is evident that the discovery of anæsthesia, even of the so-called "hysterical" type, does not necessarily justify the diagnosis of hysteria, and it is indeed high time that this much abused and misleading term, with its invidious implications, should be superseded. This is especially true as regards court cases, for the admission of the diagnosis of hysteria is liable to throw a weapon for ridicule and disparagement into a skilful lawyer's hand.

The first two of the cases here referred to were reported in the *Boston Med. and Surg. Journal* (vol. cix., p. 217), and one of them was described at greater length by Dr. G. L. Walton in the *Arch. of Med.*, vol. x., 1883. The others are here reported for the first time.

It seems to be by no means necessary that the injury causing these persistent, so-called hysterical symptoms in men should be given. A sharp sudden jolt and jar, with its accompanying emotional excitement, is enough.

Neither is a very neurotic temperament a necessary condition. In only one of the cases was this present to any marked degree.

The hemianæsthesia does not always involve all the different kinds of sensibility, or certainly not all to the same degree.

As in the case of true hysteria, there may be a relative analgesia, only discovered by deep pricking, etc., while the contact sense remains apparently unimpaired, and there is, at least, no marked disorder of sight and hearing.[1] These partial anæsthesias, however, such as incomplete analgesia, a moderate retraction of the field of vision, a

[1] According to Thomsen and Oppenheim, the concentric retraction of the visual field is the most constant symptoms.

loss or diminution of hearing for bone-conduction only,[1] might justly be taken to indicate a truthful plaintiff better than a claim of complete blindness, etc.

A loss of sensibility over parts of the body not the seat of paralysis of motion or of injury, and yet limited by the median line, would also probably be less likely to be simulated than a loss confined to injured or paralyzed parts.

A greater degree of anæsthesia over such parts seems, however, to be the rule, even in certainly genuine cases.

There is one indication of truthfulness on the part of a claimant which, although only occasionally present, is of especial value. It sometimes happens, namely, as in the interesting case to be recorded later, that the area of absolute or relative analgesia is bounded by a definite line, other than the median line of the body, being confined, for example, to one limb, or part of a limb.

If now it is found that this boundary line remains accurately the same during a prolonged examination, or on repeated examination, it may be assumed with confidence that the patient is not shamming, for it is impossible for a healthy person to observe a line of this sort with anything like accuracy. Such, at least, is the conclusion reached by Dr. S. G. Webber and myself, as the result of some experiments undertaken at his suggestion upon several individuals.

The same test would doubtless be applicable in regard to the visual field. It is also probable that even slight atrophy and diminished electrical reaction in limbs claimed to be paralyzed is presumptive evidence against malingering, inasmuch as it would be difficult for person wilfully to keep a part so still, even when not under observation, as to bring about this result.

Again, a person feigning hemianæsthesia could scarcely

[1] The importance of this sign has been pointed out by Dr. G. L. Walton. Brain, No. xx., 1883.

simulate the disorders of the reflexes met with in typical cases, especially the impairment of the reflexes excited by irritation of the mucous membranes.

Of course, it is not to be understood that these signs of functional impairment of sensation, even if accompanied by impairment of motion, etc., are claimed to show more than that the patient is not an absolute cheat. He may still be guilty of exaggeration, and even though he be proved pretty conclusively to have functional nervous disease, the prognosis may, of course, be good.

There is still great need, for the sake of a more equitable adjustment of legal claims, that the elements for making prognosis in these cases should be more thoroughly studied.

The large number of observations made by Page show that the vast majority of patients recover in all essential respects, and it is probable that even when typical hysterical symptoms are present, the prognosis is better than in idiopathic hysteria. It is also beyond a question that, after the excitement attending trial in court has ceased, the gain is almost always more rapid than before, even when there is no suspicion of simulation.

Still, what neurologist is there who cannot point to cases where no claim for damages was in question, and yet where life-long and wretched invalidism has followed some concussion injury?

It is the writer's impression, from his own limited experience, that these unfavorable cases are not those which show marked "hysterical" symptoms (disproportionate unilateral, or otherwise localized impairment of functions), but, rather, cases of general diffused debility, or neurasthenia. Possibly the typical "hysterical" cases have more unstable nervous systems than the others, and the symptoms in them are readier to come and readier to go.

The question often arises in court cases: Does the fact

that the symptoms complained of have endured a long time (previous to the trial) warrant the conclusion that they will pass away but slowly, if at all?

It is probable that this question may be answered in the negative, so far as the localized functional disorders are concerned.

Such symptoms may last indefinitely, so long as the influences are unfavorable to a cure (such as the prospect of a trial), and yet in the end pass rapidly away. Perhaps this is less often true, however, of cases of the neurasthenic type.

The question often arises in connection with jury-trials, What attitude shall be taken towards the term "hysteric"?

Senseless as the designation is, it has to the popular and to the scientific mind two different, yet both pretty definite meanings.

To the former it is almost a term of reproach, suggests exaggeration, if not half-conscious simulation.

Its pains and palsies are supposed to be only "mimic" ailments which an effort of resolution could dispel. The expert knows, however, that this view is only a coarse half-truth, that in fact hysteria is, in some of its forms, a distressing, serious, and obstinate malady, and that its "simulations" of other diseases are in reality only similarities.

The former or belittling view of hysteria is of course the one usually taken by the counsel for the defence. But if the patient really have hysteria, it is certainly better that the fact should be recognized by both sides, an opportunity claimed for explaining the nature of the disease, than that the prosecution, shunning all mention of the true diagnosis, should darkly hint at possible organic lesions, leaving it to the defence to bring forward the obnoxious word, using it as a synonym for exaggeration, womanishness, and deception.

The opinion should not be allowed to prevail that hysteria is only a "mimetic" disease.

For in the minds of those making this statement in court, the designation carries with it a flavor of unreality and insignificance.

The paralyses of hysteria are no more mimetic of the organic paralyses than the reverse is true, or than the cough of bronchitis is mimetic of the cough of phthisis. It is a case, as has been said, not of simulation, but of (outward) similarity.

CASE I.—The patient, who was a man of between fifty and sixty, of previously good health in all essential respects, and formerly an officer in the army, was travelling at the time of the accident on a railway in Massachusetts.

When near a certain station, the engine, with one or more cars, in one of which the patient sat, was, as usual, uncoupled from the rest, and allowed to run ahead, in order that the rear half of the train might be switched on to another track.

Unfortunately, the brakeman failed to disconnect the bell rope, and by the time the two parts of the train had separated to the extent of ten or twelve feet the rope was stretched taut, giving the proper signal for stopping the engine, which the engineer at once obeyed.

The rear part of the train continued its course, and struck the fore part with sufficient momentum to damage the platforms and break some of the glass in the cars.

The patient, who was sitting with his face to the engine, was jerked forwards, then back, and finally slid down between the seats, striking and scraping his back with some force against the edge of his own seat, the cushion of which had been displaced.

He was helped out by a bystander, who said to him, "Friend, are you hurt?" to which he replied that his back hurt him very much.

He was, however, able to complete his journey, under some distress, performed some business, and returned in the evening to his home, near Boston, but in the course of the afternoon was nauseated and vomited.[1]

For nearly three weeks he kept about his work, but from the day of the accident he was a changed man.

From being cheerful and active, he became listless, gloomy, dispirited, and emotional, bursting frequently into tears, and at night he was restless and delirious.

The secretion of urine was greatly diminished, and it was passed often but once a day. The hands and feet were perpetually cold, and his physician, Dr. Blood, of Charlestown, through whose kindness I was able to examine the patient later, found his pulse habitually about 60, and his temperature ranging from 97° F. to 98° F.

Before the end of three weeks, his distress had increased so much that he was obliged to take to his bed, and when I saw him, a few days later, he was the very picture of prostration and misery—pale, nervous, excited, with large and almost irresponsive pupils, and drooping lids, the skin cool, and the heart's action feeble.

He whispered to me that he had not had an erection since his illness began, and there is good reason to think that this condition has remained unchanged up to the present time, an interval of a year and a half.

The sensibility of the skin was found notably diminished at that time over all four extremities, and in fact everywhere that it was tested.

Pain and distressing sensations in the back were constantly present.

The patient was seen soon afterwards by Drs. S. G. Webber and C. B. Porter, and by all of us, subsequently, a number of times.

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[1] Other persons in the car were somewhat injured, but none, I believe, severely.

It is unnecessary to describe in detail the further progress of the case, suffice it to say that the patient became at first completely paraplegic, then, after some months, hemiparaplegic, the motions of the right leg remaining absolutely abolished, even those at the hip-joint.

It was also soon discovered that the loss of sensation had shown the same tendency with the loss of motion, to concentrate itself upon one-half of the body, and the case assumed in this respect the appearance of a typical hemianæsthesia.

The special senses were all involved in this impairment, and the hearing was diminished for bone-conduction as well as for air-conduction (vide above).

All these symptoms, even including some degree of impairment of emotional self-control, remained nearly unchanged up to the time of the trial, *i. e.*, through an interval of nearly a year and a half.

CASE II. is, in outline, as follows: The patient, who was highly neurotic by temperament and by inheritance, was thrown forward in consequence of a moderate shock of the railway car in which he was riding, so as to strike the right side of the abdomen upon the seat in front. No symptoms showed themselves for two weeks, when the legs became suddenly paretic. After a few weeks more, the left leg had improved very much, while the right became suddenly entirely helpless, even at the hip-joint. Patient came to the Massachusetts General Hospital, Out-Patient Department, several months later, complaining, besides the paralysis, of abnormal sensations throughout the entire right side.

There was diminished sensibility to deep pricking over the right leg and thigh, but not over the rest of the right side.

The field of vision of the right eye was materially contracted, and the hearing of the right ear diminished to

both air and bone conduction. The deep and superficial reflexes seemed less on the right side than the left. The mental condition and general nutrition appeared to be normal.

CASE III., an Irish laborer, was crushed seven months before applying at the Massachusetts General Hospital, between a cart and a post, getting several ribs broken, and receiving various bruises. Is easily fatigued by slight exertion, and annoyed by trembling of hands. The examination made was not thorough, partly because of want of intelligence on the patient's part, but it is evident that sensibility to deep pricking is diminished over the entire left half of the body.

SOCIETY PROCEEDINGS.

PROCEEDINGS OF THE SOCIETY OF MEDICAL JURISPRUDENCE AND STATE MEDICINE FOR THE YEAR 1884.

Fourteenth Regular Meeting.

The fourteenth regular meeting of this Society was held on Thursday evening, April 10th, 1884, at the usual time and place, the President in the chair.

After the reading of the minutes of the preceding meeting, which were approved as read, the Board of Trustees reported that they recommended for election as active members, Wm. E. Osborne, Esq., 204 Montague street, Brooklyn, N. Y.; M. D. Hanover, Esq., Tribune Building; Sam'l Greenbaum, Esq., 170 Broadway; Geo. P. Shirmer, M.D., 359 W. 42d street; H. J. Boldt, M.D., 243 W. 42d street; Wm. Stevens, M.D., 28 W. 31st street, and Alexander S. Hunter, M.D., 32 E. 29th street, and announced that the next meeting of the Board of Trustees would be held at the residence of Dr. J. J. Henna, 125 E. 25th street, on Monday evening, April 28th, at 8 P.M.

The next in order being the election of candidates, it was unanimously carried that all the candidates be voted for together. Mr. Eller and Judge Hull having been appointed tellers, after counting the votes cast, announced that all the candidates had been unanimously elected.

Dr. J. H. Fruitnight then read the paper of the evening, on the "Status of the Midwife, Legal and Professional," which was afterwards discussed by Drs. Peters, Garrigues, Wood, Harwood, Jacobi, Jacobus, Mr. Eller, Dr. Garrish, Dr. Newman, Dr. Spitzka, and Dr. Warden; Dr. Fruitnight closing the discussion.

THE STATUS OF THE MIDWIFE, LEGAL AND PROFESSIONAL.

BY

J. HENRY FRUITNIGHT, A.M., M.D.,

Fellow of the N. Y. Academy of Medicine, Fellow of the American Academy of Medicine, etc., etc.

AT the outset, there are two things which I wish to be distinctly understood. First, this paper does not favor any special or class legislation. Secondly, the object of this paper is to call attention to the lack of safeguard and protection thrown about those persons who employ the services of the so-called midwives. Reference will mainly be had to the facts of the case as they exist in New York State, and particularly in the City of New York.

Engaged as I have been in quite an extensive obstetric practice, covering the period of the last nine (9) years, it has been my fortune to be called to attend not fewer than one hundred patients, perhaps more, who were at the mercy of midwives. About twenty-five different midwives were engaged in the management of these cases. They were of various nationalities: French, American, German, Irish, and Italian. I have mentioned them in their order of merit. The French were the most adept. As to the Italians, their ignorance of the rudiments *even* of the *art* of midwifery, let alone the *science*, was more than gross. One only was American. It seems that the American woman does not take kindly to the calling of a mere midwife. She has higher aspirations. She prefers either to become a trained nurse, or if she have intellec tual ability, she will strive still higher, and become a thor oughly accomplished and equipped physician. Hence the midwife seems to be indigenous rather among our foreign-born populations.

Facts always carry weight, and I shall adduce facts, glaring facts, to demonstrate the incompetency and recklessness of these midwives. Neither vague rumors nor fanciful sentiments do I produce in this paper. I make my statements from actual and positive personal knowledge.

I will now illustrate with the histories of a number of cases how midwives often mismanage their cases. I shall start out with a recital of the last case which came under my own professional notice.

The patient, the mother of several children, gave birth to twins. The midwife in attendance, supposing that there was only one afterbirth, as in single births, left the patient after *one* afterbirth had been removed. Thirty-six hours afterward I was hastily summoned to visit the lady. I found her suffering from symptoms of some general systemic disturbance. I made a physical examination, and discovered another afterbirth reposing in the womb. The symptoms were now explained, for they were the result of septicæmia, the latter having been developed by absorption of poisonous material from the retained and decomposing afterbirth. The patient was in a very critical condition. I did not have the requisite time to attend her, and I transferred her to the charge of Dr. Wm. Fruitnight, my brother, to whose unremitting attention and care her recovery is due.

A few years previously, on a Thanksgiving night, I was called to a patient in the upper part of the city, upon whom the same midwife was in attendance. When I reached there, I found blood all over the bed, over the floor, over the patient, over the midwife, in fact everything was a mass of gore. This woman had had the temerity to attend a case of placenta previa, one of the most formidable complications that can possibly occur in the whole range of the obstetric art, and a condition of affairs which always causes even the most expert in the science and the

art to look forward to the issue with fear and trembling. She had been with the patient for three hours when I reached the scene. Three valuable hours had been sacrificed—hours that might have saved the patient's life, and possibly the child's also, if proper aid had been soon enough sought. What had been done by the midwife? Absolutely nothing. I rendered the services indicated as speedily as possible, yet my patient succumbed on the following morning from sheer loss of blood.

Again I have been summoned hastily at midnight to a patient in the throes of labor, who had been suddenly thrown into convulsions, with a midwife in attendance. I delivered the patient at once, but just as her babe was born the mother expired. The patient had suffered from uræmic intoxication, the result of Bright's disease of the kidneys. How different the result might have been had she been under the observation of a skilled physician! The diseased condition of her kidneys would probably have been discovered sufficiently early, proper methods of treatment would have been instituted to guard against the occurrence of convulsions, which then most likely would have been escaped, and the pregnancy would have terminated in a successful and happy delivery.

It has also transpired that I have been called to attend what is known as a transverse presentation, commonly called a cross-birth. I have not been sent for, however, until the presenting part has been so wedged down in the pelvis that the operation of turning was executed only at the expense of great skill, difficulty, and risk.

Furthermore, in breech presentations I have been called again and again, when the head of the child had actually been jammed down into the inferior strait. Necessarily in these cases, from the delay before the requisite skilled assistance is at hand, a dead child is the result.

I could add many more instances of mismanagement,

but I shall conclude with stating that the most common fault lies in the fact that the midwives allow the child's head to become impacted to such a degree that before it can be released by instrumental aid death of the child results from asphyxiation. I can cite a very large number of such cases.

In a recent issue of the daily press, an account is given of a patient who died whilst attended by a midwife. The facts are these: an unmarried woman was taken in labor, and was delivered of a still-born child. Thereafter the patient was apparently recovering. The midwife left her patient after the delivery, and did not return. Two days afterwards, the woman became seriously ill. She grew worse, and died on the third day. Dr. Trask, of Astoria, a well-known obstetrician, had in the mean time been summoned. He referred the case to the coroner for investigation. The autopsy showed that the patient had been very much mutilated. Dr. Trask stated that this was not in consequence of a criminal operation, but from sheer ignorance on the part of the midwife. This same midwife asserted that she had practised thirty years and had never lost a woman or a baby. When asked to show her diploma, she replied that she had obtained one in Germany, but that it was "all torn up now."

The minor faults of mismanagement are innumerable, and I shall pass them by without further comment.

I shall also refer to another danger to which those who employ midwives are exposed. One of the midwives I knew was suffering from syphilis in an acute form of the disease. I warned her to desist attending labor cases, for she might infect some patient or child. Yet, despite my remonstrances, she continued actively at work, thus endangering her patrons with the risk of syphilitic infection,

The midwives usually live in the crowded districts of the city, where contagious diseases prevail. She may be

in the centre of a focus of infectious diseases, yet she does not scruple to continue her work, and very often indeed she is the medium of contagion, conveying the virus of scarlet fever, diphtheria, etc., to the lying-in woman, who at that period is peculiarly susceptible to, and receptive of, any and all disease germs.

If a medical man should show himself guilty of such pronounced mismanagement in cases of labor as I have just related, he would without delay be made a party to a suit for malpractice. The midwife, however, goes scot free.

In my contact with these midwives, I have frequently asked them how they had qualified themselves for the work. I will relate the replies of some of them.

Midwife A says that she had studied with an older midwife for a period of three months. The preceptress had taken the pupil along to witness a number of cases, and thereafter she was competent to perform the same services for others.

Midwife B asserts that she was taught by Dr. So-and-so to practise the art, but as the doctor is dead, her statement cannot be verified. Most probably she was a monthly nurse who gained a smattering of the subject from remarks incidentally let fall by the physician.

Midwife C said her mother had been a midwife and she had been taught the work by the same, a case of inheritance or succession in the art, as it were.

Midwife D said she had borne a large number of children herself. She knew all about it from personal experience. She was a widow and in want, and as she could not stand hard work, she thought that she would turn her attention to midwifery.

Midwife E pinned her faith and practice to a book on obstetrics written by Dr. Lee about half a century ago. I purchased the book from the midwife, and

is still in my possession. This midwife is a German, whose knowledge of the English tongue is more than imperfect. She is one of the very worst of her class that I have ever met with. One can surmise the amount of good she could have derived from the perusal of the afore-mentioned book. Upon a study of that book she claimed to have the ability to practise the art of obstetrics. By the way, this is the only piece of literature of the subject that I have come across in my intercourse with this class of people.

Recently there have appeared a few midwives from so-styled colleges of midwifery. The self-constituted faculties of these institutions may or may not have actual and proper qualifications to teach and examine candidates in this special branch of the medical art. The profession at large has no guaranty that they are thus qualified. They are private stock-holding concerns. The motive of their establishment cannot be for the protection and benefit of the public. Their transactions, as very recently revealed, are questionable. The real motive can be readily found. They are schemes that suggest only too plainly why they were called into existence. Speculation is rife in all departments of life and does not hesitate to play even with the sacredness of life and health of the community. It is ridiculous and an insult to the sense of the profession that such institutions can qualify properly educated obstetricians.

It is, moreover, a step backwards to establish these self-elected faculties with the power to confer a diploma to practise an important branch of the medical art. To-day the body of the profession throughout the land is clamoring for a higher standard of education, and for a severer test and examination for admission to its ranks. Appeals have been made to State legislatures to create independent State Boards of Examiners to license applicants for entrance into the medical profession. In my opinion, such

should be the case, and a higher grade of medical men would be the result. Yet, as I have just stated, here in these colleges of midwifery an irresponsible minority of the profession assume and presume upon the right to grant a diploma and a license to practise obstetrics. Any body of physicians could come together, obtain a charter, and flood the county with newly fledged midwives. It is not expedient, it is not right, it is not just to the medical profession, to the State, or to the people at large. Let no private diploma mills be countenanced by legal act.

In reply to a letter, Dr. John T. Nagle, of the N. Y. City Board of Health, writes to me as follows: "There are about 650 midwives registered at the Health Bureau of this city. Their qualifications are various, a number of the foreign-born midwives have certificates from the various countries in which they were born. Others are recommended by physicians, or have diplomas from incorparted colleges of midwifery.

"The rule of the Board in regard to the registration of midwives is this. They must either be recommended by physicians of reputable standing or have certificates from colleges of midwifery before they are allowed to sign the register." You will perceive by this that the regulations governing the practice of midwifery in this city are of the crudest and loosest character. I believe that there are more practising than are registered at the health office. Another question arises, who will vouch for the statements that these women make to the officers of the Health Board?

There is no certain guaranty, no adequate protection afforded to-day by the Board of Health to those employing midwives.

Can a physician be held responsible for an accident that may happen after his assumption of the care of the patient, which accident is traceable to the previous mismanage-

ment of the midwife? This is a point upon which the lawyers can enlighten us.

Special or class legislation is always vicious. Among the legislative enactments of this State no statute pertains to the class of midwives.

Obstetrics is a department of the practice of medicine. By a recent law of this State it is incumbent upon those practising medicine in this State to register in the county clerk's office of their locality.

The midwives practise obstetrics, a branch of medicine, yet not one in this city has registered in the county clerk's office. Hence it seems that under this statute they are amenable to prosecution by the county medical society for not complying with said law. The county society, however, has not yet prosecuted any of them. This is another point upon which it will be desirable to hear the views of the legal profession.

I shall here make a digression in order to enter a little upon the historical aspect of the subject. On page 142, Vol. ii. of "The History of Medicine, Surgery, and Anatomy," by Wm. Hamilton, M.B., published in 1831, occurs the following:

"About the same time that the forceps were invented, an important revolution took place in the practice of the obstetric art by the introduction of the fashion among females of rank of employing male practitioners, whose assistance it had never been usual to call for hitherto in any but the most urgent and dangerous cases. This revolution was effected in 1663 by the talents and reputation of Julian Clement, an obstetrician of celebrity who contributed largely to the improvement of the art. By reason of his great reputation, he was called in in the year 1663 to the Duchess de la Vallière, who, in consequence of the novelty attending the introduction of male practitioners in such cases, is said to have removed to a private house

for the purpose, and to have received him in a mask, so that he remained in ignorance of the rank or name of the person he delivered. His success in this case attracting the attention of the king, he was appointed accoucheur to the princesses of France, with a handsome pension. This led to his subsequent employment by other ladies of the court, and Clement's great popularity succeeded in vanquishing injurious prejudices, and in a little time effected the complete substitution of male for female operators in all obstetric cases among the better classes." On page 143 of the same volume, the author continues: "One of the most important results that followed the great revolution in practice was the progressive reformation of those abuses which had been suffered to accumulate through ages of ignorance and timidity."

In an excellent abridgment of the art of obstetrics as it was in the epoch of Hippocrates, it will be observed that the author, whenever he speaks of matters relating to accouchements, addresses himself to *midwives*, which makes it probable that physicians were called in only in grave and extraordinary cases (page 110). The art of obstetrics remained very much behind the other branches of surgery, notwithstanding very estimable efforts of some surgeons to lift it from the state of degeneration to which it had been relegated. There was a very particular cause of obstacle to its progress. The most of the women employed in childbed were ignorant old matrons who attached to their old routine which had been followed from time immemorial, and repelled all innovation. Called in extraordinary cases only, physicians could not acquire, except with difficulty, the experience that inspires useful and necessary reforms (page 462). Thus writes P. V. Renouard, M.D. (translated by C. G. Comegys, M.D., 1856), in his History of Medicine, published in 1856. The same accusations, then, are brought up to-day against midwives in general as centuries

ago. Midwives have not kept pace with the development of the science. The science has outstripped their art, and the midwife as a skilled, properly qualified, and competent practitioner of the specialty of obstetrics is not to be found. The midwife, then, as she existed in the past is but a relic and cannot claim a position in the body politic which she fain would presume to do. To-day the art and science of midwifery has become quite exact. It has been taken out of the hands of ignorant midwives, and it has been raised to a higher plane. Since it has been rescued from the hands of midwives, great strides have been made in the development of the art. Nowadays one cannot practise obstetrics competently, skilfully, or intelligently unless he or she possesses some knowledge of all the branches of medicine and surgery. For they all are tributary to a proper appreciation of the science and art of obstetrics. The midwife as a specialist in this branch of medicine should have no place in the future.

The creation of national, State, and local boards of health implies that it is the duty of the State to protect and to care for the health and lives of its subjects. It is especially the case in the practice of obstetrics that the aid of medical knowledge is palpably necessary and efficacious.

The life of one or two beings in perfect health, aside from the concomitant conditions of pregnancy, may depend upon a manœuvre, more or less skilful, not limited to the act of birth alone, but applying to the entire period of gestation and labor. Hence, as the properly skilled and qualified practice of obstetrics intimately affects both the health and the life of two human beings, the State should exercise some supervision in the matter.

I have not yet referred to the motives actuating those who employ midwives. They are either modesty of a mock character, economy, or avarice. As I suggested, the modesty is of a mock character, for very often the

conversation and allusions that escape the lips of the midwife and friends to cheer up the patient are more than filthy. An honorable and dignified physician would so comport himself that the patient's modesty would suffer no violence, and pruriency would most certainly not be countenanced by him. Hence this motive is not so potent a one as many would have us believe. Next, as to economy, most midwives, who make any pretensions, claim as a maximum fee what some physicians would regard as a minimum fee.

There are a large number of physicians who are willing to assume the charge of patients who will pay this moderate charge. I refer not only to the younger members of the profession, but to those even of longer experience in the profession. For the latter know that the patients cannot afford to pay more than they do, and their desire is to rescue the humble patient from the possible mismanagement of a midwife. Therefore, economy need not be a motive to employ a midwife. Lastly, I cited avarice as a motive. This mainspring of action is much more prevalent than is generally known. I know of a great many families who are well-to-do, yes, who own real estate, carry on extensive business establishments, and possess good bank accounts, who habitually employ midwives to confine the women of their families. I can call to mind a case in one of the mansions in one of the up-town streets, how a lady was confined by a midwife, how septicæmia supervened, how eminent physicians were summoned, but all to no avail, for the patient gave her life as the penalty for rashly intrusting herself to the care of an ignorant midwife. Avarice, the most reprehensible motive, can be shown to exist in many other similar instances. Legislation only can affect those whose avaricious disposition will expose their families to the dangers of unskilled midwifery.

The midwives are very jealous of the physician; they

will not permit him to be sent for until they find it absolutely unavoidable. Then usually it is at the sacrifice generally of the child, possibly of both mother and child. She fears that, if the physician be called, she will lose her fee, or at any rate that she will suffer a reduction thereof. Her solicitude is not for the benefit of the long-suffering patient, but for her own gain.

Much reference has been made to the flourishing of midwives in the European capitals. Yet even there they are not the models which they seem to be from this distance. For in the recent numbers of the special journals, of Germany in particular, much ado is made about the abuses that exist among the class of midwives. At a recent meeting of the N. Y. Co. Med. Soc'y, Dr. Garrigues stated that, in those European centres, public sentiment was forcing the midwife aside and drawing the physician more prominently to the front in the management of even normal labor. One reason why midwives flourished in foreign countries was the disparity between the supply of physicians and the demand for their services; in other words, the proportion of physicians to the population was comparatively small. In this country it is not so; there is an abundance. The proportion of medical men is very large. Hence in the older countries it was difficult to obtain medical aid at all times, and the midwife was a necessity. In this land, no difficulty need be had in obtaining skilled medical help in obstetric cases, and the midwife is no longer a necessity. If the patient, from a true sense of modesty, dislikes a male physician, she can select one of her own sex from a large number of skilled and well-qualified lady practitioners.

As so often stated, the midwives are mainly from the ignorant classes, whose sense of morality is apt to be loose. Hence it is to be feared that they will extend their domain, as they already have often done, to attempts at practice in

other directions, not stopping even at the commission of criminal abortion. A little knowledge is a dangerous thing, and they possess just enough knowledge to be very dangerous. The midwives, as we know them to-day, are not progressive, but stationary. As their mothers and grandmothers did before them, so they do now. In their manipulations they are very rude, and they often resort to the most primitive methods of delivery as they are practised even to-day among the uncivilized peoples. Patients have told me that they have been fairly tortured by the manœuvres of these midwives.

I have met with a very large number of cases of septicæmia, usually resulting in death, among women who have been delivered by midwives. Many of these patients have gone through a normal labor, and a few days later I have been summoned because the patient has fever. Nearly always it is too late to save the patient. What does the midwife know about the dangers of septicæmia and the precautions to be used against its occurrence?

When such men as Professors Thomas and Lusk and others look forward with apprehension to the termination of a case of labor, how can a mere uneducated midwife be expected to be on the alert for the hidden and treacherous danger?

In the practice of obstetrics, conditions are continually arising which call for a knowledge of and experience in pure medicine and surgery. Inflammatory troubles may occur, and as the practice now is it may be necessary to perform the immediate operation for a lacerated perineum. Would the midwife admit to the patient that the perineum was torn? Not at all, for she would consider it a reflection upon her skill. Possibly she might not know that such an accident had happened to her patient. What is the result? The patient will live a miserable life from many derangements that will certainly follow an unrepaired

perineum. What will the conscientious physician do under such circumstances? These lacerations are liable to happen at any time in normal labors, in the hands of the best experts in the obstetric art. The physician tells his patient candidly what has happened, he performs the necessary operation, and the patient is relieved and freed from any ulterior unpleasant after-effects.

This is, in my opinion, the most important reform that has been made in the practice of obstetrics in this recent period.

I think I have demonstrated that it is necessary to have *some* knowledge of medinine and surgery to practise the art of obstetrics. The midwives now in the field do not possess such knowledge; therefore, they are not properly qualified to practise the art, and they should not be permitted to practise it.

It may be said that some women will at any and at all hazards *not* employ a physician, but a midwife instead. A little further on in this paper I shall meet this objection.

Two conclusions are to be drawn from the facts in this article. First, that the status of the midwife to-day in New York State is *nil*, and the only legal enactment that can possibly affect them is the law of registration in the county clerk's office, as referred to in a former portion of this paper. Secondly, their professional standing, both as to qualification, competency, and morale, is of the worst and lowest possible degree.

What remedies can be suggested? To me there are but two alternatives. One is to dispense with the midwife altogether and confine the practice of the obstetric art to the properly qualified members of the medical profession; the other alternative is to call into existence a class of women who shall constitute a kind of superior trained nurse. They are in no respect to be looked upon as skilled obstetricians or trained specialists in a department of

medicine, but rather to be considered as an order created supplementary to the obstetricians to supplant the presumptuous midwife. Let them be licensed by the State authorities, not by any unauthorized private college of midwifery. Let their functions be only to supervise the normal labors. Compel them to summon a physician on the slightest provocation of a departure from a normal labor. If they are derelict in this respect, let them suffer a severe penalty for such negligence. Let a corresponding responsibility complement the privilege and right to practise, by making her amenable to suits for malpractice equally with the medical man. Let there be a rigid law of registration affecting them, and let all its requirements be strictly enforced. It may be objected that in cases of precipitate labor, where the child has already been born before the arrival of a physician or such legally qualified assistant to labor, serious accidents might occur unless the woman be speedily relieved. It will be said that, if the penalties were to be so rigorously enforced, no one but a qualified person will dare to interfere in behalf of the mother and child. It seems to me that in such cases the letter of the law might be applied a little more leniently, permitting some woman who had borne children to come to the relief of the patient pending the arrival of the proper assistant.

If I have enlisted your attention to an appreciation of the abuses now existing, and to the absence of positive safeguards in the practice of the obstetric art, I shall feel that this paper has not been prepared in vain.

DISCUSSION ON THE MIDWIFERY QUESTION.

DR. J. C. PETERS: I am strongly in favor of the proper education, registration, and control of midwives, and I hold that no midwife should be allowed to practise without complying with the requirements suggested. I may be permitted to cite one or two instances illustrating one point made in the excellent paper of the evening, as to how midwives are now being turned loose to practise. One of the persons who sold "diplomas" to midwives for thirty dollars a piece, had been successively a barber, a butcher, a hospital-nurse, and a cigar maker, before "entering" the profession of medicine on a diploma himself had forged. The other was a man who had been sent to the penitentiary for resorting to the device of having a coffin filled with bricks interred as that of a person whose life had been insured, in order to get the insurance. This person also sold midwifery diplomas, and was aided in this business by a colleague with an eclectic diploma, who is probably selling them to-day. It is not surprising that such strictures of midwives should be passed as were made in the paper, in view of these facts. A great many of them are undoubtedly abortionists, and unfit morally and medically for their position.

THE PRESIDENT: We would be glad to hear from Dr. Peters how the matter is regulated in Europe.

DR. PETERS: If I can form any idea of the curriculum the midwives have to pass through in Europe, from the books they are compelled to study, I should say that it was a very thorough one. Whoever masters such treatises is competent to practise midwifery. There are a number of such competent midwives in this country, and I believe they are honest and worthy.

DR. GARRIGUES: I am somewhat more familiar with midwifery practice abroad than in this country. Dr. Peters is right about the text-books, and the conclusions he draws from them. The chief complaint made about midwives abroad is, that as a rule they come from a low class of the community. Their legal fee is very small, and their social status low. Though their course of study is lengthy and they have good teachers, they are devoid of any preliminary education, and cannot discriminate as to what knowledge is proper to get. Besides, they are unable to keep up with the progress of knowledge, and become stationary, practising old and abandoned methods. I would for all these reasons be reluctant to see their number increased, and am in favor of Dr. Fruitnight's first alternative, to put the matter in the hands of the

physicians altogether, for there are enough physicians, about 1 : 480 of the population, and there is every facility for securing abundant medical attendance. I cannot see that the money question enters in any phase seriously embarrassing; as those who cannot pay a physician in private practice may secure better medical attendance gratuitously than midwives can furnish, at our dispensaries, college clinics, and maternity hospitals. Even the theoretically well-instructed though inexperienced medical student is a better aid than many of these (so-called) experienced midwives. In a German medical journal I recently read that in Mecklenburg the ravages of small-pox and the cholera combined did not equal those of the midwife—committed in an indirect way.

DR. C. S. WOOD: This is eminently a proper question for medico-legal consideration. It is well known that it was attempted to secure medical influence in favor of certain bills at Albany, that we had some talk over the matter at the County Society, and that the various projects were voted down by an overwhelming majority. I am hence surprised that the author did not incorporate in his paper some suggestion or resolution through which the sense of this Society could be expressed. We physicians have to work and study hard for three years before we can approach a labor case, and when we do, it is with the terrible anxiety of a most serious responsibility, and yet it is proposed to turn out midwives educated—if it can be called that—in self-constituted schools, whose ignorance is bliss and who hence have no such anxiety in consequence to compete with trained and capable persons in a most critical field of medical labor. If we make any declaration on the subject, we must declare against any project which proposes to extend the sphere of the midwife's labors. There is one serious question of a criminal matter involved. Persons of low morale, such as are numerous enough among nurses and midwives, yield readily to the temptations which induce persons to practise abortion. I know of one who practises this "branch" of the obstetrical art without much concealment, and I know furthermore that her favorite prescription is an infusion of cotton root.

DR. E. C. HARWOOD related a case in which he had intrusted certain applications to a trained midwife and nurse, the infant suffering from *ophthalmia neonatorum*, and in which, on returning after a certain time, he found that she had jeopardized the child's sight by her ignorance and bad management.

DR. A. JACOBI maintained that the doctor had intrusted too much to the midwife, and his case did not, for that reason, consti-

tute a reason for discouraging the proper education of them. He strongly sustained a view opposed to that of the author of the evening, claiming that everything that had been said against midwives applied to the badly educated alone. Dr. Garrigues' argument was faulty, because the part of Germany which he cited, Mecklenburg, was the most backward in culture and could not be taken as a type of the country, or of Europe. Dr. Garrigues' statement that the midwives belonged to the lower orders was not susceptible of proof. His own knowledge was to a different effect. He had practised obstetrics in the tenement districts, when many present were very young. He had served for as small a fee as five dollars; but there were people willing to pay, who could not pay even that sum, and yet afford a midwife. Why force these people to rely on charitable institutions?

DR. HARWOOD asserted that the functions intrusted to the midwife, in his case, did not exceed in responsibility those ordinarily delegated to nurses in hospitals. If such simple matters as external applications could not be safely intrusted to midwives, it struck him that they had very little to do, in most cases of labor.

DR. JACOBUS strongly advocated the position taken by Drs. Fruitnight, Garrigues, and Wood.

MR. ELLER: I can understand all the medical objections to the bills that have been referred to, and concerning which it would be be well to have some concise information. However desirable it might be to turn over the responsible branch of obstetrical practice to the doctors, it certainly would be legally not feasible to forbid one woman from assisting another.

DR. GARRIGUES: I can certainly not disprove Dr. Jacobi's statement about the class of the population from which the midwives of Germany are recruited, as I am not as familiar with that country as Scandinavia, but I refer Dr. Jacobi to a German professor, Kestner, himself chief of a midwifery school, who complained that his pupils were too illiterate to comprehend what they were expected to learn. In Scandinavia, nearly the entire obstetric practice is in the hands of midwives, and how the plan has worked there, may be judged from the fact that there is a concerted movement to intrust obstetrical practice entirely to physicians. I believe that the lawyer who just spoke is right: that it would be illegal, perhaps even unconstitutional, to forbid women aiding each other.

DR. GARRISH declaimed excitedly against Dr. Jacobi for accepting confinement cases at five dollars, and could scarcely find terms

strong enough to denounce this, as he called it, "disgrace to the profession." DR. NEWMAN sided with Dr. Jacobi. A colloquy between DR. A. JACOBI and DR. SPITZKA arose out of the latter's reference to the motion advocating the school, as surreptitiously sprung on the County Medical Society, and as encountering merited defeat, owing to the general impression in the profession that it smelled of a "job." DR. JACOBI said the statement was unwarranted, and an unjust reflection on himself. DR. SPITZKA did not understand how it could be a reflection on Dr. Jacobi. Dr. Jacobi had at the meeting of the County Society professed perfect innocence of any previous knowledge of the bill, and he (Dr. Spitzka) had believed him, and supposed, up to the present moment, that Drs. Jacobi, Loomis, and Mundé had been utilized as figure-heads without their knowledge. Dr. Jacobi's warm advocacy of the scheme, and the readiness with which he took as a personal reference what had on the earlier understanding not been intended as such, was calculated to create a different impression. He had certainly not intended to refer, as he had been unaware till this moment that he had referred to Dr. Jacobi as a mover of the bill, and if Dr. Jacobi admitted that position, he would regret deeply having taken cognizance of it.

DR. WARDEN recapitulated the history of the various bills presented before the County Society, maintained that the position of Dr. Jacobi was unsound, and trusted that the Society of Medical Jurisprudence, if it acted on the suggestion of Dr. Wood, would join with the County Society in opposing the jobs before the Legislature.

DR. FRUITNIGHT briefly closed the discussion as follows :

All rules have their exceptions, but the latter always prove the former. I refer to the kind of midwives whom Drs. Jacobi and Newman have met with. I do not deny that there may be such, and who have been educated by Scanzoni or his peers. However, I fear that there are but a very few. It would be gratifying to know how many. I have not met with them. I refer to New York City as it is to-day. As Mr. Eller says, the midwife is an evil as she flourishes in this city to-day. If possible, let the practice be restricted to physicians. Midwives do now exist, and probably cannot be prevented in the future. The only thing to do is by legislative enactment to hold them to a strict accountability, and to a specified limitation in the extent of their practice. Finally let there be a rigid execution of penalties for any and every dereliction on their part. What I have said are facts, and they can be proved.

MR. ELLER then offered the following :

"*Whereas*, An effort is now being made to enact a bill in the legislature of this State for the incorporation of a college of midwifery; and

"*Whereas*, Such proposed bill fails to surround the proposed legislation and the privileges sought to be obtained by it with those safeguards which the present state of science and the proper protection of society demand; therefore, be it

"*Resolved*, That it is the sense of this Society that the proposed legislation and bill should not be adopted, and that no bill of similar purport and objects be passed unless it fully comply with the requirements of medical science and the art of obstetrics, which a conscientious regard for the welfare of society dictates." This resolution, after being discussed, was moved to be amended by Dr. Jacobus, by having everything after the words "art of obstetrics" erased; seconded, but lost on the vote. The original resolution was then unanimously carried.

It was then moved, seconded, and carried that a copy of this resolution, signed by the President and Secretary of this Society, be forwarded to the committee of the County Medical Society appointed to go to Albany to prevent the passage of the College of Midwifery bill.

The thanks of the Society having been, by motion, tendered to Dr. Fruitnight for his able paper, and a letter from Dr. Pinard, of Paris, thanking the Society for the honor conferred upon him in his election, having been read, the Society adjourned.

Fifteenth Regular Meeting, May 8th, 1884.

The fifteenth regular meeting of this Society was held at the Academy of Medicine on Thursday evening, May 8th, at 8 P.M. In the absence of the President and Vice-President, the Society was called to order by the Secretary, and nominations for the position of chairman were received. Dr. E. C. Spitzka was thereupon nominated and elected to fill that position.

The minutes of the preceding meeting having been read, Mr. Livingston moved to amend the clause embodying the motion of Dr. Jacobus to amend the resolution of Mr. Eller, as the language of the minutes was ambiguous. The motion, having been duly seconded, was carried, and the minutes corrected. There being no other corrections, the minutes were ordered adopted as read.

The report of the Board of Trustees, recommending for elec-

tion as honorary member Jabez Hogg, M.D., M.R.C.S., F.R.M.S., of London, and Dr. F. W. Russell, of Winchendon, Mass., as active member, was then, by motion, adopted.

Dr. Russell was unanimously elected to active membership, Mr. Livingston and Dr. Meier acting as tellers.

Dr. Henry Howard, of Montreal, then read a paper entitled. "Why Doctors and Lawyers Fail to Agree," which was very well received, and discussed by Mr. Kitchell, Ex-Judge Hull, Mr. Delaney, Mr. Benn, Mr. Livingston, and closed by Dr. Howard.

After Dr. Howard's paper had been read and discussed, a vote of thanks to the author was passed. Dr. L. C. Gray then read a paper on the Fillmore will case, discussion on which was postponed after remarks by Dr. Howard. A vote of thanks was given to Dr. Gray.

WHY LAWYERS AND DOCTORS FAIL TO AGREE.

BY

DR. HENRY HOWARD,

Montreal, Canada.

MR. PRESIDENT AND GENTLEMEN:—I suppose it to be in order, and that my first duty is to thank you for admitting me as a member of your most scientific society.

I am afraid that the title of my paper might lead you to suppose that my life has been spent in disagreeing with lawyers, but I assure you such is by no means the case; on the contrary, my legal friends and I get on first-rate, particularly those of them who are engaged for the defence, for it is upon that side I am always to be found, unfortunately for my pocket, for you know the clients that I am called upon to defend are not the paying public. But one thing in these cases always appeared to me very funny that my legal friend, by some means or other, is sure to get his fee. And my impression is that the more he charges the more he is thought of. I throw out this hint to any modest lawyer that may be present. As to my confrères, you know we are supposed to live upon our philanthropy. It would be a shame for a medical man to ever even think of his fee, that is to say, we wish the public to think that of us. Well, gentlemen, it is one thing to consider why lawyers and doctors fail to agree; but he would be a pretty clever fellow that could tell why doctors themselves fail to agree. You know that old and true saying, "Doctors differ and patients die." But it is equally true that doctors agree and patients die just as frequently as when the doctors disagree. But I must be cautious, and not lead you into any professional secrets.

You know I am bound to protect the honor of the profession.

Here I must tell you a little anecdote. We have in Canada a very pious member of Parliament, who is always trying to enact laws to protect women from men. A few months past, a very worthy man thought he would sound me so as to discover my views on the subject. My answer was, "every woman is the guardian of her own honor, and I consider it an insult to every pure woman to try and enact such a law." You see I remembered that I had a mother that was dead and a wife that was dead, but had been the mother of my children. Well, gentlemen, what I said of woman I say of the members of the medical profession. Each man has in his keeping his own honor, and if he don't guard it himself, no law and no rules of society will make him an honorable man, and I am sorry to have to admit before this Society that there are members in our profession who are anything but honorable men, and under no circumstances is this truth more fully established than in courts of law, where the counsel for the crown or the people never find any trouble in obtaining any number and more so-called doctors prepared to prove anything, particularly against the accused, and yet be as ignorant of physiological psychology, of the medical jurisprudence of the case before them as they generally are of physical science, and these are the class of medical men who are one great cause of leading society to believe that a difference exists that does not exist between lawyers and the truly medical expert; and here I must accuse the members of the legal profession for not choosing the proper men as experts, but call any man that may be dubbed doctor, men that they would not call in to attend one of their own family. Recent events in both Canada and the United States justify me in these

remarks, where all science was lost sight of, buried in a popular cry.

But, sirs, there is an antagonism between the criminal law, as it stands, and between many members of the medical profession, more particularly when the question to be solved is one of sanity or insanity, and it appears to me that this antagonism arises from the two recognized orders of philosophy clashing where they never should come in contact, and if each order were kept in its own domain they never could become antagonistic; but, unfortunately for the good of society, such is not the case. The dogmatic *à priori* or speculative philosophy is the philosophy of the theologians, and logically admits of no reasoning; there is nothing in it that appeals to our reason. God is *vera causa*, therefore never can be phenomena; soul is entity, *vera causa secundum*, therefore never can be phenomena. God revealed his will to man, and holds man responsible to him for his acts. This is dogmatic philosphy. This the philosophy upon which all religion is based. This is the philosophy best suited to make man religious and fit him for a future life, by appealing to his emotional organization. This is the only philosophy suituable for religion, and religion is its proper domain, and as long as it is confined to its domain there should be no clashing. But it has not been so confined; it has been made the basis of social order for thousands of years, and it has failed because of its unfitness to establish a social order, except one, not only in antagonism with itself, but with all the forces of nature. All our legislation and all our laws have been based upon this dogmatic philosophy; all society has been graded, from the beggar to the king, upon this philosophy. What education the people of all nations have received has been based upon this philosophy. Upon this philosophy men have been elevated to be demi-gods, and others have been made

slaves. Above all the sovereign powers that ever reigned in any of the countries of Europe, the emperors of Russia and Austria have been the most logical, because they have been most in accord with this philosophy, when most despotic. When the sovereign of England gave the people a constitution, and recognized that governments should legislate in accordance with the will of the people, it was an illogical act, because it did not at the same time renounce dogmatic philosophy as the basis of law and order. So with the great American Republic; it was illogical in rejecting a king, and not at the same time rejecting the philosophy by which the king reigned and governed. To have been true to herself, she should have remodelled her laws, not looking back at precedents, but moulding them in a different mould, and not recast them in the mould of the old dogmatic philosophy.

But we have another philosophy, not a new, but the oldest of all old philosophies, natural philosophy, physical science founded upon facts, known in the present day as physical science or experimental philosophy. This philosophy does not aim at the supernatural, it don't go beyond the natural order, leaving questions of the supernatural to dogmatic philosophy. But this philosophy claims that by it, and it only, can social order be established so as to produce a harmonious whole, so as that there can be equitable justice to all. It teaches that for progress and development and the advancement of a true civilization, there must be division of labor, therefore grades in the social order, but it makes these grades dependent upon ntelligence and consequent morality. This philosophy does not say anything of soul, but it teaches us that mind is a phenomenon of matter, and proves it anatomically, physiologically, pathologically, histologically, and psychologically. It shows to us, through experiments and observa-

tion, that all matter and all phenomena have their own peculiar physiology. It teaches us that man's psychosis depends upon the physiology of the matter of which it is the phenomena. It shows us that sanity is the phenomena of physiological matter; that insanity is the phenomena of pathological matter, and imbecility the phenomena of teratological matter; in fact, it shows us that every man is, in society, what he is, whether he be good or bad, in virtue of his physical organization. This don't square with the dogmatic *a priori* speculative philosophy which teaches that a man is bad because he wishes to be bad, because he prefers badness to goodness. That if he knows right from wrong, he must be held, by his fellow-men, responsible for his acts. That he does wrong because he has not the fear of God before his eyes, and is tempted by the devil. So these two philosophies, when each is kept in its own domain, never clash, but when one encroaches on the other, as in the case of the dogmatic, encroaching, as it has, upon the domain of the experimental philosophy, then comes resistance and antagonism. It is now hardly necessary for me to repeat the question I began this paper with. The reason of the antagonism obviously is, that because all our laws are based upon the dogmatic or *à priori* speculative philosophy, and the judge, to be logical, must rule upon this philosophy, and the reasoning of the expert physical scientist is based upon experimental philosophy, there necessarily follows antagonism between the members of the two professions. And this antagonism will always exist, and consequently there will be always injustice, till we recognize experimental philosophy the only true basis upon which to found all jurisprudence, all medical jurisprudence, and all education, and all social order. The medical profession and the legal profession will never advance to their proper scientific standing till their education is founded or based upon ex-

perimental philosophy, and where should the first move come from, what body of men more fit to take the lead in this social revolution than the members of "The Society of Medical Jurisprudence and State Medicine of the United States of America"? It should be the society to prove to the world that physical science should be the beginning and ending of all education; it is as necessary for the agriculturist as it is for the professional man. It is necessary for morality and social order.

In connection with the medical jurisprudence of insanity, let us, for example, consider the subject of free will.

Dr. Maudsley, the well-known author of "Body and Mind," has lately published a book on "Body and Will," and judging his book by the reviews of it, it is evident he has not succeeded in making himself comprehensible to his readers. But he is not the first writer that has placed himself in a similar position, and it is certain he will not be the last, if for no other reason than the meagreness of our terminology in physical science, and the different meanings given by different persons to that terminology. Then there is the question itself; there can be no more difficult question to solve, particularly when we remember that freedom of will up to the present has been undisputed; indeed, to deny it was tantamount to committing a crime.

The man who will solve the question of free will confers a boon upon the human race.

What is will? Is it entity, something without genesis? If so, it must be supernatural, and never can be explained by physical science, which can only treat of matter and its phenomena. What is meant by the term free as connected with will? Does it mean that the will is independent of all other governing powers of all Nature's forces, that it acts *per se* of its own power, and not only is it uncontrollable, but that it controls? If this be the case, then

where comes in man's responsibility? Why should he be either rewarded or punished for his acts, if he has to obey this entity, this free will? If this is not the conception of those, if they have distinct conception, who are always speaking of free will, then I have no conception of what they mean.

Now, there can be no possible doubt but that man has a will, nor can we doubt but lower animals than man have wills also. The naturalist sees it exemplified every day; indeed, the most ordinary observer sees it every day exemplified in our domestic animals. Therefore, it is evident that will, like mind, is not an entity, but is simply a phenomenon or force of matter called into action by another phenomenon or force that for want of a better term we call desire, and there are a thousand different physical phenomena or forces that call desire into action, and the natural law is for will to co-operate with or obey desire. True, that will can, under certain circumstances and in peculiar cases, by means of the nerves of inhibition, control, not desire, but the actions proceeding from desire, but it cannot in all cases control actions prompted by desire. Therefore, the will cannot be said to be free. For example, hunger creates the desire for food, thirst for drink, weariness for rest and sleep, pain for relief, excessive cold for heat, excessive heat for cold. Here are cases where will force cannot for very long, not only not resist desire, but cannot control the actions called into existence by desire. From this it follows that, if the physical phenomenon or force, desire, be normal, the physical phenomenon or force, will, must also be normal, and actions the result of these two forces, will and desire, will be normal also, will be in accordance with natural laws, because of the equilibrium of organic forces.

On the other hand, if the physical organs be abnormal, there will be a want of equilibrium of physical forces

and a struggle between the forces, will and desire, when generally the latter comes off victorious.

Speaking, then, of normal physical phenomena or forces, we may rationally speak of free will, if that by the term we mean that the natural course for the will to take is to be led by another phenomenon or force, viz., desire.

But how are we to judge of our organisms and forces as to whether they are normal or abnormal? By testing them by Nature's two great laws, self-preservation and doing to others as we would have others do unto us, or not doing to others that which we would not have others do unto us. Nature has not left us without a safe guide by which each and all of us can test ourselves. If we live and act in accordance with these laws, if our motive be to live and act in obedience to these laws, and we succeed in doing so without any violence to any of our forces, we may be sure that our organic forces are normal. This will be to live a life of morality, because of the equilibrium of physical forces. On the other hand, should we live in the breach of these laws, we may be sure that we have abnormal organisms and consequently abnormal forces. It appears to me that desire must precede will, and motive must precede action.

This question of free will, upon which so much has been written, has derived all its importance from a mistaken idea of what constitutes crime, and what is it that renders a man responsible for his acts to society. If our penal code was based upon physical science, we would cease to hear so much of free will, because then we would look upon every man to be a representative of what his physical organization made him, and treat him accordingly. He would be tried by Nature's laws for any offence he would be guilty of against social order, and if found guilty of the offence, he would simply be separated from society as an abnormal man that must be taken care of for his

own sake, as well as for the protection to society ; to restore him to his place in society when, if ever, he should become a normal man, and if never, never to be returned to society. Thus would we be kindly working with Nature for the fulfilment of her laws for the development of social order, and for the consequent happiness of the majority of the human race.

Another great cause of all this writing upon free will, which the more it has been written upon, the more it has been found incomprehensible, is trying to make a criminal code to square with the teachings of theology, trying man, who is of the natural order, by a supernatural law, or what is believed to be a supernatural law.

Admitting for the sake of argument that the book we call the Bible is of the supernatural order, is God's revealed will to man. To the Catholic, as interpreted by the Catholic church, to the Protestant, as each interprets it for himself, with so many and various opionions of its meaning, how could it be made applicable to mundane government? How could man, who is of the natural order, be judged by his fellow-man, who is of the same order, by a supernatural law? It is all right and reasonable that God should judge us by his law, for he cannot err; but that man should judge his fellow-man by a supernatural law is an absurdity of the highest order, and it is the effort to do this and maintain the appearance of justice that has been forcing men to speak and write of free will and the right and wrong theory till there is neither sense nor meaning in their writings, and certainly nothing approaching to justice. There are natural laws by which all nature is governed, and man as part and parcel of nature, and these laws are all-sufficient for man in his social position, all-sufficient for the government of the human race, and if society governed itself in accordance with Nature's laws, there would be more justice in the world, and consequently more happi-

ness; if for no other reason than that men would come to understand each other, one of the great causes of our present social evils is that we really do not understand each other. How does it stand between the legal jurist and the medico-legal jurist? The legal jurist, under our existing penal codes, must maintain the theory of free will as laid down by the dogmatic or *à priori* philosophers of past ages, while very many medico-legal jurists, guided by the light of physical science, must hold that free will, as understood by the former, is actually a misnomer; that will, like mind, is a phenomenon or force of matter subject to physical laws.

As I have already said, however, the subject of free will is a hard subject to write upon; as entity it is incomprehensible, and to me only comprehensible when treated of as a physical force or phenomenon, free in a degree, but its freedom is limited.

In concluding, gentlemen, let me hope that the time may soon come when physical science will demolish the barrier, the reason "Why Lawyers and Doctors fail to Agree."

THE FILLMORE WILL CASE.

BY

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As the evidence in the contest over the will of Mrs. Fillmore filled some three thousand written folios, it will readily be understood that I cannot, in a paper short enough to be read before a society, undertake to do more than give the substance of the facts. In doing this, I have been greatly aided by the briefs of counsel, one upon the law, the other upon the facts, kindly put at my disposal by Messrs. Candler, Jay & Brush, and Messrs. Johnson & Lamb.

Mrs. Caroline C. Fillmore was the widow of Mr. Millard Fillmore, ex-President of the United States. He died in 1874. After his death, Mrs. Fillmore lived, in a manner that may justly be termed secluded when compared with the active social position that she had formerly occupied, in what is known in Buffalo as the Fillmore Mansion, a large, gloomy structure upon one of the most fashionable squares in the city. The contestants claim that in 1877 (about September), some three years after the President's death, a great change took place in her character; and that the refined lady, accustomed to the amenities of the highest official position in our country, somewhat imperious at times, it may be, but yet of gentle breeding, was gradually metamorphosed into the chronic lunatic, given to capricious outbursts of coarse and profane rage, familiar with her servants, haunted by the most absurd suspicions, possessed of unquestionable delusions and hallucinations; and acting, upon occasion, in a manner that

can be accounted for in no other way than by insanity. It is not denied that, in October, 1880, Mrs. Fillmore had a stroke of paralysis, involving one-half of the body, what is technically known as hemiplegia; nor is it denied that she never fully recovered from this stroke; or that, in August, 1881, she had a second stroke of paralysis, from which she died. After her death, two papers were offered to probate. One was a will dated January 15th, 1879. The other was a codicil bearing date of May 8th, 1880. It will be observed that the will was made some eighteen months after the alleged onset of the change in character in 1877, and some nine months before the first stroke of paralysis in 1880; whilst the codicil was executed some five months before that same event. The contest in the case was, therefore, upon the question as to what was Mrs. Fillmore's mental condition from 1877 down to the first stroke in 1880, as well as in the time that elapsed between the first and second paralytic attacks.

It is conceded that the paralytic attacks were due to cerebral hæmorrhage. Mrs. Fillmore was about sixty-seven years of age. The most probable cause of cerebral hæmorrhage in an individual of that age would be that disease of the arteries which is known to the physicians by the name of chronic endarteritis (*endo*, within, and *arteritis*, inflammation of an artery), and which renders the arteries brittle, inelastic, weakened in their structure, and liable to burst; and it is conceded that this arterial disease was present. This arterial disease, as is well known to medical men, is very gradual in its growth, often being present for years before it manifests itself by any of the symptoms to which its presence gives rise, often, in fact, being found at *post-mortem* examinations in individuals in whom its presence during life had never been suspected. In fact, the very surrogate who presided at this court trial, with all his seeming intelligence, was

listening and thinking with blood that came through such diseased vessels; for within a short time, some four months after his decision was rendered, he has died suddenly of cerebral hæmorrhage. So, also, Mr. John C. Perry, whom the President recently appointed to the chief-justiceship of Wyoming Territory, and to whom a farewell dinner was given, died suddenly from the same cause, on the very day that he was to have left for the West. The strong probability, therefore, is that Mrs. Fillmore's cerebral arteries were so diseased for some time before her first stroke of apoplexy, in October, 1880. How long? is the question that naturally arises. In answering this question, certain facts in relation to the blood supply of the brain must be first considered.

It seems trite to remind an audience like this, even although it is largely composed of lawyers, that one of the most important factors necessary to a healthy condition of the brain is that it should be properly supplied with blood. Disease of the blood-vessels interferes, of course, with this proper supply, by obstructing the channels; by diminishing that elasticity of the vessel-walls which normally propels the blood equably along, as water will be propelled through a rubber hose; by the blocking up a vessel by a clot, so that no blood at all can pass through it, and so that the area of brain usually fed by this blockaded vessel is starved of its blood; by the bursting of a vessel, and the consequent damage to the brain which ensues from the outpoured blood and the destruction of the vessel from which the blood has come, and which can necessarily act no longer as a blood-carrier. What symptoms will arise from such arterial disease will depend upon what arteries are affected. Some portions of the brain subserve the purely intellectual functions, as in what is known as the cortex or vault of the brain. If the arteries going to these be diseased sufficiently to interfere with the proper supply

of blood, the intellect will become impaired. The mental impairment, in proportion to the arterial disease, may be so slight as to be indistinguishable from mere caprice or bad temper, or it may show itself in well-marked insanity, or there may be shades of impairment anywhere between the two extremes, or it may gradually and insidiously progress from the one extreme to the other, and puzzle lawyers, a prejudiced community, and a surrogate, as it did in Mrs. Fillmore's case. Other portions of the brain are made up of the different nerve-fibres which are distributed to the nerves of general and special sense, to the muscles, and to the other tissues of the body. Where there is sufficient disease of the arteries leading to one of these regions of the brain, there will result a loss of muscular power—what is in common parlance known as paralysis, although this term is used in a far wider sense by physicians—by some loss of ordinary feeling, or by impairment of sight, hearing, smell, taste, or by one or more of these symptoms combined. It so happens that, in many cases, the artery that goes to any purely mind-serving region also goes to an adjacent region composed of the nerve-fibres which have been mentioned; wherefore disease of any such artery may give rise to both mental and physical symptoms.

I hope I have thus made clear that disease of cerebral arteries may produce:

1. Purely mental symptoms;
2. Purely physical symptoms; or
3. A combination of mental and physical symptoms.

I hope, moreover, to have made equally clear that the facts to be determined in regard to Mrs. Fillmore were:

1. Whether she had manifested such mental impairment as would destroy her testamentary capacity before the first stroke of paralysis in October, 1880, so that she was

legally incapable of executing the will bearing date nine months before January 15th, 1879.

2. Whether such mental impairment was present after the first stroke, and between it and the second stroke from which she died.

In September, 1877, Mrs. Fillmore paid a visit to Clifton Springs, a sanitarium in the western part of this State. Dr. Foster, the physician, who was also one of the proprietors of the establishment, had known her in former years, and found her much changed in that she was so extremely excitable and moody, and her nervous system seemed so broken down that he suspected that she took liquor and morphine. One of her servants, who accompanied her to Clifton Springs, and who was called in defence of the will and codicil, testified that upon one occasion, after she had been visited by some revivalists, she excitedly exclaimed, "Hell is let loose, and the hounds are after me!" She was visited at Clifton Springs by a Mr. Hawley, an old gentleman who had resided next door to her in Buffalo for many years, and he found her very excitable and nervous, so that his attention was attracted to the fact at the time. Several of her servants stated that during 1877, and up to the first stroke in 1880, she frequently made use of such exclamations as: "Darn; My God; Devilish; Damn such people; Damn such work; Curse the name of Fillmore; Cussed ladies; My God, My God, is there no God in heaven, or on earth, or is there no God at all!" She often spoke of her coachman as "My blessed John!" and, by way of antithesis, of her friends as "These devilish ladies." Referring farther to these ladies, she gently remarked that "those cussed ladies came there and talked her to death." "Cuss them, she wished she had some infernal screw-driver to screw up their everlasting tongue, so that she could talk enough to suit them for once!" She came in to her seamstress upon three different occa-

sions, wearing a mask that represented a young woman with blue eyes and flaxen hair, took the mask off and laughed, showed the sewing-woman a number more that she had in a drawer, and said that she used to go the theatre in such a mask with her husband, the dignified President of the great United States. A Mrs. Dewey, a professional nurse, was with Mrs. Fillmore for two days, May 9th to 11th, 1878. She describes these scenes:

"She grew more and more restless towards the afternoon. In the middle of the forenoon, she sent me to the clothes-press to get a double gown or gentleman's dressing-gown. I went there and got one. She said that was not the one, to get another. I went and got another after a little hunt, and she put them both on. She was still in bed. She put them both on over her night-gown. These were very old garments indeed, not good for anything. I gave her two plaid shawls. One of them she put on over her head, and one over her shoulders. By that time I began to think there was something curious about her, but did not know what to do. Then she looked at me out of the corners of her eyes so strangely, I sat down beside her. It seemed a great while, but I suppose it was only two or three minutes. Then she threw them off and turned over as if going to sleep. She lay a little while in that manner, and then she sat up and began to talk pleasantly about things, and so it passed on and began to be night again. . . . The next morning she seemed to be very unreasonable. After she had had her breakfast, she wanted me to place the pillows around her. She wanted to sit up. She had two or three little stools covered with carpet, and a wicker chair, and I was to put these to her back. There were six or eight pillows with a bolster, and I placed them at her back, and they remained there—well, about perhaps a minute—and then they all went into the middle of the floor. She said I didn't know the first rudiments of nursing.

I picked them up and placed them around her again, and they didn't suit, and she threw them off again. Just then Fanny came in with her tray, and she asked her to fix them, and didn't say anything. 'There,' said Mrs. Fillmore, 'that is something like!' Fanny went out and closed the door, and the pillows went into the middle of the floor again. She had followed me around the room with her eyes very disagreeably. Finally she said, 'Mrs. Dewey, when would you like to go home?' Mrs. Dewey very sensibly and promptly answered 'Instantly.' Mrs. Fillmore thereupon paid her, and the nurse immediately left the house, greatly relieved at getting rid of her distinguished patient."

I have been careful to preserve the exact phraseology of this graphic description. Uncontradicted, it would, in my opinion, determine the case, for I think it is one of the best unstudied descriptions of chronic mania that I have ever read, and by all odds the best that I have ever heard from the witness-stand.

Mrs. Fillmore became very angry at one time with her waitress for a trivial reason—merely because certain pillow-cases would not fit the pillows. She became so angry that she is said to have literally foamed at the mouth, and, as the servant expressed it, she "walked up and down the room, and tramped and stamped, and shook her fist at me," put her hand under the maid's chin, and said, 'You would love to get a knife and cut my throat, if you dared." This same domestic, Nellie Kelly, relates two more remarkable incidents. Mrs. Fillmore wanted the girl to get things ready for the dentist, whom she was awaiting, and the girl got a basin, and towels, and other necessary things. The dining-room table had not been cleared off, and a broken dish lay upon it. Without any apparent cause, Mrs. Fillmore took another dish and pounded the broken one with it until the latter was in small pieces, cutting the ta-

ble-cloth in many places. Upon another occasion she found fault with some beef-tea that had been brought to her, accusing the cook of retaining the nutriment and sending in only the water. She went into the kitchen and wanted the cook to taste the beef-tea. The cook refused. Some few words followed, when Mrs. Fillmore threw half of the beef-tea over the cook, half in the sink, and pushed the cook violently against the cup-board; after which she went into another room, and complacently remarked that she was "boss in her own house." It is stated that upon this occasion "she almost toppled over."

She is said to have had daily fits of excitement, during which she would rush through the house, slamming doors and talking to herself. Her servants one day repeatedly knocked at the door of the room without receiving any response. Becoming alarmed, the household gathered about the door, and one of them looked beneath and saw her walking around the room. The visits of her friends usually excited her to a great extent, so the servants stated, although she was pleasant to them personally, and during this excitement she would scold violently, slam doors, and scream, after which she would lie down perspiring, complaining of weariness. At bed-time one night she said to her maid that they would find her some morning with a rope around her neck. A woman was dusting some pictures in the parlor. Mrs. Fillmore said the woman should not touch them for fear of spoiling them, quickly became very angry, began to scream, and ran around the room, lashing everything with a whip which she held in her hand. A servant was preparing some medicine for her. Mrs. Fillmore desired her to take the cover off a sugar-bowl. The servant said she would in a moment. Mrs. Fillmore flew into a rage, grasped the cover, and flung it at the servant. Mrs. Fillmore was being bathed by her maid. She accused this

girl of trying to kill her, to drown her, and behaved otherwise in such a manner that the girl hung her head when in the witness-stand and could not be prevailed upon to give the details. A seamstress was giving Mrs. Fillmore some strawberries at her breakfast, and goes on to relate this scene: "I held them so she could get them, and first she would shirk them up a little ways, and then she would shirk them down, and then she knocked them out of my hand, and at dinner-time she did the same thing with a cup of tea. She said to me I was a fool, and didn't know anything. Her manner at the time was like a person that would not be in their right mind. I had her bolstered up in bed so she was almost sitting up. When I tried to bolster her up in bed, she threw her bolsters and pillows out of the bed on to the floor. Said I didn't know anything, and didn't know how to fix her." One servant states that she left Mrs. Fillmore because she (the servant) was afraid of being killed. Mrs. Fillmore's cook had boiled her a piece of tenderloin. Mrs. Fillmore found fault with it, and said it was not what the cook had been told to get. The cook went down into the kitchen, got the steak from which the tenderloin had been cut, brought it up-stairs, and showed Mrs. Fillmore that the tenderloin fitted into it. Mrs. Fillmore was very angry, said the cook was trying to kill her, and flung the steak into the grate. When angry, she would at times increase the variety of her acts by flinging the keys from her basket over the floor, and telling the servants to pick them up. Dora Kestler, one of the servants, gave this narrative:

"She frightened me one day. It was on a Sunday morning. She was going to church, and she says, 'When I ring the bell you come up-stairs.' I said, 'Yes, ma'am,' and when I came up-stairs, she had the wardrobe upside down and everything out of it. I had never seen it open before. She said, 'Here's some of my things gone. I

don't say you took them, but it was some one. It may be years and years ago. I have not been to the wardrobe since a year,' I think she said. I thought it was time, if she was going to church, that she should get ready. She called me to put a dress on her, and she had another waist for me to put on her. It was in her dressing-case, and just as I was buttoning it on her, she says, 'Go 'way, you are just as bad as all the rest of them. You act like the devil himself. You can't do anything more than the rest of them. Not for love nor money can I get any one to do anything for me. My God, my God, will I never get rest? No, never, till I take a razor and cut my throat; then they will all come and dance on my grave, and say, here lies poor Mrs. Fillmore.' I made up my mind I wouldn't stay there any more, and I went home that afternoon. She acted so wild, and walked up and down the room, shaking her fist at me."

This same witness gives a description of another curious scene. She had asked the witness to put on her (Mrs. F.'s) gloves. The girl attempted to do it, but Mrs. Fillmore, holding her hand up, kept wiggling her fingers so incessantly that it could not be done. This went on for about half an hour. Finally Mrs. Fillmore said angrily, "Why don't you put on my glove?" "I can't because you don't keep still," rather sharply answered the maid; when her mistress responded, "How dare you speak to me like that!"

But one of the most singular chapters in this odd story is that which deals with what became known during the progress of the trial as the Sizer will. This was a document that was executed in September, 1879, and afterwards disappeared, probably having been destroyed by Mrs. Fillmore. It must be borne in mind that the will which was finally offered to probate, and from which the art, the education, the religion, and the suffering poor of

Western New York are now about to receive or are already receiving such great pecuniary benefits, was made in January of the same year, some eight months before, and that it was drawn up by a Mr. Marshall, a prominent member of the Erie Country bar. The facts concerning this Sizer will were testified to by a Mr. Tanner, Mr. Sizer, who drafted the will, and Mr. Crandall, who witnessed it. Mrs. Fillmore came to Mr. Tanner, with whom she had only a slight acquaintance, and expressed a desire to have a new will made. It was agreed that Mr. Sizer should be the lawyer. Mr. Tanner then said that he would bring Mr. Sizer to Mrs. F.'s house. To this she would not listen, but insisted that she should come to Mr. Tanner's house, stating as her reason for this that Mr. Marshall had all her servants in his pay, and was having her watched.—Let me say, by way of parenthesis, that Mr. Marshall afterwards took the stand, and testified that he believed Mrs. Fillmore perfectly sane, so that he could not have been aware of what she was saying of him.—Mr. Sizer was, therefore, taken to Mr. Tanner's house. But Mrs. Fillmore would not see him. She sat in a room on a different floor from him, and sent him her instructions on slips of paper which were carried by Mr. Tanner. These instructions were very difficult to understand, and necessitated frequent trips between her and her lawyer. A sample one was put in evidence, and reads in this highly instructive manner:

"Mr. T. residuary legatee, give so much and reserve to myself to give more if I quietly prefer to do so; ladies of the home, Mrs. K., Mrs. H., Mrs. T., Mrs. H., and Miss Grace B. to attend me if sick, and to take the general care and see that silver, etc. Also, Mrs. T., especially come and look after me, and will you and Mrs. T. go to New York, some time if I desire it. I want to feel of course (at your convenience) after consultation a sort of pleasant in-

dependence and affectionate reliance." It was difficult to make her understand the provisions of the will. She said she had not a relative in the world, although she had five first cousins. She was very undecided in her wishes—wanted, among other childish things, to have the names of her legatees put on the back of her pictures, so that if she changed her mind at any time, she could rub out the names and put in others. For four days this melancholy farce went on. She made the gentlemen go out the back way, so that they would not be seen by any one. She seemed to have a special fear that her coachman, "my blessed John," who was mentioned before, would hear that his employer, the widow of a President, was bold enough to make a will without his knowledge. She cut off John's two little children, to whom she had left bequests by the former will. She held up this former will, and said it was not her will, it was Mr. Marshall's will. She finally had to admit Mr. Sizer and Mr. Crandall to her presence, in order to have the will read to her and attested. During the reading, her manner is described as flippant, girlish, paying more attention to her dress and hair than to the paper, restless, occasionally excitable. Several times Mr. Sizer had to pause in his reading, because she would talk with Mrs. Tanner. When she signed the document, she made great ado about the pen, trying its nib, etc. The three gentlemen, before another day passed over their heads, expressed their belief that there was something wrong, and that they would say so if the will was offered to probate. The only wonder is that it took them four days to come to this conclusion.

The testimony of John Jamison, the coachman, of whom mention has been made, was highly interesting. Jamison is a very intelligent man, who had been in her service for some sixteen years, who was dismissed by her a year or two before her death, but who, when she became helpless,

was sought out by the executor and re-employed for her. One day in the summer of 1879, she said to her coachman, who was in the library with her: "Come here, John; see there, John, don't you see the devil there watching me?" "No, ma'am, there is none there." "There is, John, there is." John says his flesh crept and his hair stood up. She persisted in her delusion, in spite of all contrary assurances. At another time she informed Jamison that the devil was chasing her through the room and pinching her. She would receive visitors in a friendly way, and yet, as soon as the doors were closed upon them, would curse them heartily. Her conduct to her servants was very capricious, abusive and kind by turns. She told Jamison that "the devil was after them through the house. She knew, because they could not be so devilish unless the devil had something to do with it." One evening she became very angry with one of the servants, Annie Ryan, who afterwards testified that she thought her sane. She said Annie Ryan wanted to kill her, and insisted that Jamison should go to the police station for an officer, forgetting that there was an electric alarm in the house by which one could have been summoned. Jamison went out and came back shortly, telling her he could not find an officer, and she was perfectly satisfied. Jamison was driving her over an ordinary city-street. There was some doubt in the evidence as to whether she had not been driven over streets that badly needed repairing. It is entirely immaterial as to whether this was the case or not; so I will assume that it was the case. She became greatly excited, yelled and screamed, with a stick punched the coachman in the back, and shouted at him: "What do you want to do? Do you want to kill me? Why don't you drive me somewhere else, and not run me over the rocks and stones." Jamison stated that she would frequently scream while taking her drives, and loudly, and without

any apparent cause. She told Jamison that her maid-servants were constantly trying to kill her. In the spring of 1880, she made the coachman take her sleigh-riding, although there was scarcely any snow covering the stones, and cursed and shouted at him when he remonstrated with her, accusing him of wanting to kill her. She confided also to Jamison that she had sacrified her life for seventeen long years for the name of her husband, exclaiming: "Curse the name of Fillmore." She went out to the stable early one morning, told the coachman that the servants would give her nothing to eat, made him get out of the carriage and drive her to the hospital for breakfast.

Her "blessed John" so excited her ire upon one occasion that she called him, ungrammatically, "a darn fool." She would frequently run around for some fifteen minutes at a time, and would then lie down exhausted, exclaiming: "My Lord and my God, will I never get rest?" In June, 1880, Mrs. Fillmore paid a visit to Gettysburg with a party of friends, among them a lady of high social standing in Buffalo, the wife of a prominent banker, and who was one of the witnesses at the trial. Mrs. Fillmore took a sudden dislike to one of the ladies of the party, and to one of the waiters at her table; why, no one knew. Mrs. Fillmore was at this time frequently subject to what were described as "excited spells." She was treated everywhere with the greatest consideration, for was she not a distinguished guest? The head waiter at the hotels, desiring to pay her special attention, approached her, and expressed his hope that everything had been satisfactory to her during her stay. She turned upon him violently, scolded so loud that she could be heard all over a dining-room of sufficient capacity to seat three hundred people, said she had been all over the world and had never been in a place before where she could get nothing to eat. The banker's wife, al-

luded to above, was so mortified at the scene that she got up from table and left the room.

It is testified to that her suspicions were by the wholesale. She suspected Mr. Marshall, as we have seen, a member of the Erie County bar, of irreproachable character, of making detectives of her servants. She accused her husband of having cheated and wronged her, claiming that he had acted in concert with two well-known public men of spotless reputation, carrying this delusion so far as to alter entirely her directions about a certain monument to her husband. She thought her servants were trying to kill her, to starve her, to drown her, to poison her. She thought every one was in a conspiracy to get money from her. She refused to pay a bill presented to her by her physician, claiming that it was a swindle. Mr. Tanner went to the doctor, saw the items in the doctor's book, returned to her, proposed that she should make him, Tanner, a present of the amount of the bill, which he would give the doctor; to which she quietly assented, and the matter was never mentioned again. She is described as "trembly," in 1878. At times, from 1877 down to the first stroke in 1880, her speech was at times thick, indistinct. In the spring of 1880, she had some distinct weakness of the left side. In March, 1880, Mrs. Fillmore was attended by one of the best-known and most competent members of the medical profession of Buffalo. This was about two months before the codicil was made. He found her excessively irritable, very weak, of poor digestion, with some shortness of breath from pulmonary emphysema, disturbed by trifling causes, with hardened arteries, especially over the temples, an ephemeral irritation of the skin, unsteady in gait, unstable of purpose. This physician thought that this condition of things had existed for some time.

This is the substance of the testimony given by Mr.

Tanner, an old and highly-respected citizen of Buffalo; by Mr. Tanner's wife; by Mr. Crandall and Mr. Sizer, both gentlemen of excellent standing at the Buffalo bar; by Mr. Hawley, an old and wealthy gentleman who had lived next-door to the Fillmore mansion for many years; by Mrs. Jewett, the wife of a prominent banker; by Dr. Foster, the proprietor of the Clifton Springs Sanitarium; by Mrs. Fillmore's dress-maker; by her seamstress; by her nurse; by her coachman, who had lived with her sixteen years; by two of her waitresses; by her chambermaid. This testimony covered the period from 1877 down to the first stroke of paralysis in the autumn of 1880. By it was proven:

1. That there had been a grave change of character in Mrs. Fillmore about the year 1877, as evidenced, among other things, by her behavior at Clifton Springs in September of that year.

2. That this change of character had deepened into the most irrational behavior and speech, as was made manifest:

a. In 1878, by the mask scene; by the bolster scene; by the "blessed John" expression; by the wish about the screw-driver wherewith to screw up her everlasting tongue, etc.; by the scene with the strawberries and the cup of tea and the bolsters; by her behavior when the nurse was with her and she put the dressing-gowns about her; by the sugar-bowl scene; by denying the doctor's bill and then settling it by a vicarious gift; by so frightening a servant that the servant left, in fear of her life; by the scene about the tenderloin; by sending for the police when a telegraph instrument in the house could have summoned one.

b. In 1879, by her ride to the hospital to get something to eat; by the hallucination of seeing the devil and pointing it out to her coachman; by the sleigh-ride when there

was no snow on the ground; by the scene when her maid was attempting to put on her gloves; the scene in the bath-room, of which only a partial description could be gotten; running around the room and threatening to cut her throat; breaking one dish on another; throwing the beef-tea over the cook; shutting herself up in her own room, and paying no attention to the knocks of her alarmed household.

c. In June, 1880, by the memorable visit to Gettysburg.

d. By her exclamations, wild and causeless anger.

e. By her delusions about being robbed, cheated, wronged; about her servants' wanting to kill her and starve her; about her lawyer bribing her servants to watch her; about Mr. Fillmore and his friends having wronged her.

f. By the occasional thickness of speech (aphasia); by the partial paralysis of one side; by the occasional tremor; by the occasional foam upon the lips; by the occasional vertigo.

To offset this mass of testimony, a cloud of witnesses came floating into court, among them three of Mrs. Fillmore's household servants. One of these servants was the one who made known to the court Mrs. Fillmore's exclamation, after the visit of the revivalists, that "hell" was let loose and the hounds were after her. This same witness made these admissions:

"I always knew Mrs. Fillmore was a high-tempered woman.

Q. You say she was excited. What was there about that excitement? What was there that indicated that she was excited? *A.* Nothing could please her before she left the house, and it was nothing could please her after she came back. Everything went wrong.

. . . Never saw her throw the meat in the fire, but heard she did so.

Q. Was it to Dr. Foster that you stated that what she wanted was something for her mind, rather than for her body? *A.* I didn't state that here.

Q. No, not here; but didn't you ever state, as an opinion, that you advised or told Dr. Foster that what she needed was something for her mind, rather than for her body? *A.* I had said so to Dr. Loomis.

Q. Then it was Dr. Loomis that was attending to her when you said that? *A.* At one time when I said this I remember saying so to him. . . .

Q. During that time she was at Clifton Springs, didn't her excitement increase? *A.* It did.

. . . *Q.* and she liked the doctor? (referring to Dr. Foster). *A.* Yes, she liked him very much.

Q. And she had these fits of excitement when he was present? *A.* I never saw her angry when the doctor was present. . . . She could control herself. She could be in a high temper, and then the very next minute turn round and be a lady. . . . Admits that she might have told another of the witnesses that Mrs. Fillmore was out of her head at times; that she told this witness that she had had a dreadful time at Clifton Springs with Mrs. Fillmore; also, that she could not remember whether or no she had informed any one that Mrs. F. had threatened to cut her own throat, and then piteously exclaimed: "I wish you would let me go home! I don't remember anything of that kind. I think you had better let me go home, for I can't tell you any more." She admits that Mrs. Fillmore "made a good many peculiar speeches."

Another one of the three household servants who testitified to their belief in Mr. Fillmore's sanity admitted that she had told one of the lawyers that she had tried very hard to forget her life with Mrs. Fillmore, that she certainly did not try to remember it, that she did not consider Mrs. Fillmore in sound health, for she thought her

nerves were not sound. This bit of testimony is significant.

"*Q.* Didn't you state also that she found such fault with her food and the table service that you didn't see how her butler stayed with her? *A.* I think he had a great deal of patience to stand it.

"*Q.* Because he was very careful and attentive to her desires? *A.* He seemed to be.

"*Q.* Was there any cause that you could see why any fault should be found with that table while you were there? *A.* No."

When this witness left Mrs. Fillmore, she was dismissed with the tender injunction, "Get out of my sight, for the sight of you makes me sick."

The butler, who is alluded to above, thought Mrs. Fillmore's conduct unreasonable, but not irrational.

Out of all the household servants, therefore, who were put upon the witness-stand, all but one testify, reluctantly or willingly, to irrational acts or expressions of Mrs. Fillmore down to the time of the first stroke, and that single exceptional one thinks those acts unreasonable, although not irrational. Of the witnesses other than the servants, there were a number offered in defence of the will. The most of them were legatees, and, in order to testify, they were obliged to renounce. It was, therefore, a daily spectacle in the court to see witness after witness ascend the stand, and, in modern Abrahamic fashion, offer up his or her cherished offerings to—the fair fame and sanity of their kind benefactress. It is sad to think of the large amount of property that has, in this pure spirit of self-abnegation, been diverted from its proper channels! The most important of these witnesses was the legal gentleman who drew up the will. He had never seen any evidences of irrationality in Mrs. Fillmore, and maintained that she looked actively and intelligently after her own affairs. But although

her investments were being frequently changed during the years when he had charge of her property, he could not recall a single instance of her having directed an investment, or of his having consulted her about one! The other witnesses were social friends and acquaintances of Mrs. Fillmore's, one of them her pastor and his wife. Some of these called upon her once or twice in the year, others more frequently, some saw her in the street or when making purchases, and the pastor and his wife saw her quite frequently, and her gratitude to the pastor's spiritual offices was such that she left his church several thousand dollars, and himself, several thousand dollars more. But none of these, with the exception of the lawyer who drew up the will, had had such opportunities of observing her closely as had been presented to the household servants, Mr. and Mrs. Tanner, Mrs. Jewett, Mr. Crandall, and Mr. Sizer, and Dr. Foster. Moreover, it is repeatedly stated that she could control herself to a certain extent, and expressly is it affirmed that she could be very pleasant to her visitors, and then behave outrageously, cursing them vigorously, when their backs were turned. A number of letters were put in evidence to show that Mrs. Fillmore could write intelligently. Some of them were seemingly intelligent, others were extravagant; in one she speaks of a person as living who had been dead for some time; none of them in themselves contain irrefragable proof of her insanity.

The testimony, then, up to the time of the first stroke of paralysis in 1880, is that of a number of delusions, irrational acts and expressions, detailed specifically by her household servants and those who had the best opportunities of observing her, offset by the belief in her sanity of a number of individuals who either saw her casually or under circumstances when she would be apt to control herself, and offset furthermore by letters, of which some were seemingly rational, others extravagant. The ques-

thus meets us at once, Could Mrs. Fillmore be as insane as the servants declare, and yet be able to seem rational to so many intelligent people who saw her occasionally, as well as retain her ability to write seemingly intelligent letters? Any one who will spend twenty-four hours in a lunatic asylum will satisfy himself that this was quite possible. I am quite sure that I could take a layman to any large asylum, and be able to pick out some lunatic with whom he may talk as much as he will, without discovering the signs of insanity; and yet a few days' observation of that lunatic, or the history of his career, would satisfy any one of the insanity present. As an instance in point, about a year ago, I was requested to go to an asylum near New York, to pass upon the mental condition of a young gentleman who had been sent thither upon the commitment of two of my most intimate friends, one being Dr. E. C. Spitzka. I spent over an hour in the examination of the patient. He made certain statements which his mother, brother, and fiancée claimed to be probably true, which his father claimed to be untrue. This was, therefore, a mere matter of fact. Apart from this, I could not discover the slightest symptom of mental aberration. I visited him again at the end of a week, spent another hour with him, and failed again to find any certain signs of insanity. I said to his friends that I could find nothing wrong with him, but that the fact that he had been committed by my friends, both of them accomplished alienists, as well as that he had been pronounced insane some time before by a distinguished neurologist in another city, made me inclined to believe that he might be in a comparatively lucid interval. He was taken out of the asylum and sent to Europe with his brother. I saw him again before he went, but discovered nothing to alter my opinion. In Europe he soon began to behave so outrageously that his brother brought him home in a few weeks. I saw him soon after

his arrival, and he was then one of the most unmistakable and dangerous lunatics upon whom I had ever set my eyes. I promptly committed him to the asylum, and a few months afterwards he killed himself with opium. Mrs. Fillmore herself reasoned intelligently upon her delusion that Mr. Marshall was having her watched. She went to Mr. Tanner's house to make the will. She made the lawyers go out and come in the back way to and from Mr. Tanner's house. She would not go into the same room with them, but for four days sent her directions on slips of paper. This unquestionably crazy transaction of the making of the so-called Sizer will was marked by many seemingly intelligent acts. She gave her directions, of which many were seemingly intelligible. She held up the former will, and said it was not hers, it was Mr. Marshall's. She listened to the reading of the Sizer will, acknowledged it as hers, talked over some of the clauses with Mrs. Tanner, and finally signed it. There is nothing in the whole testimony offered by the proponents that is any more seemingly intelligent than this; and yet went cheek-by-jowl with a manner, acts, and delusions that denoted well-marked insanity. Moreover, her rooted delusions about Mr. Marshall seem never to have been suspected by him, in spite of his seeing her quite often. It must also be well understood that no attempt was made to show that the unfortunate lady was either intemperate or addicted to the use of narcotics, for the very simple reason that there was abundance of proof to the contrary.

We now come to the period of about ten months that elapsed from the first stroke on October 19th, 1880, to the second stroke and her death, on August 11th, 1881. During this time she never regained the use of the right paralyzed side. She lost her speech—had what is known as aphasia—to such an extent that she could only utter "I say; I say the truth; yes; no"; and occasion-

ally "Good night." Her attending physician and her nurse thought that they could understand her wishes, and that she maintained her intelligence. They failed however, to give a single instance in which it could certainly be said that she manifested intelligence, and they admitted that she often used even her limited stock of five expressions in the wrong way, saying "No," when she meant "Yes," and vice versa. The nurse, too, testified that she would scream wildly at times, without cause. If Mrs. Fillmore was the chronic lunatic that she would seem to have been from about 1877, it is scarcely probable that the cerebral hemorrhage in 1880 acted as a mental stimulant; and when paralysis checked her maniacal movements, and her wild expressions are cut to five short confused ejaculations, it would seem as if something more tangible were needed to establish her sanity than the mere opinion of a nurse, and a physician who had no specialistic qualifications.

Mrs. Fillmore was, in my opinion, a sufferer from chronic mania, of which the cause was the chronic arterial disease from whose effects she died. Dr. John P. Gray, of the State Asylum at Utica, Dr. A. E. Macdonald, of the New York City Asylum for the Insane, and Dr. E. N. Brush, first assistant physician to the Utica Asylum, followed me upon the witness-stand, and declared their belief that Mrs. Fillmore was insane. The proponents called no experts. Mrs. Fillmore's family physician, who testified in their favor, admitted that he would believe Mrs. Fillmore insane if he could believe the testimony of the contestants.

Gentlemen, I know but little of the law: and, if you will pardon me for saying so, in matters relating to insanity I have little desire to know more. This I do know, however—if a person be insane, and the law says he is rational, the person will remain insane, and the law will not be ra-

tional. It is the business of the law to conform to the facts as presented by the proper representatives of science. It is in nowise the business of medical men to fit science to the law. Science is truth of a certain class, or the nearest human approach to it, and Law is the attempt, often a very bungling one, to ascertain what Science knows. The decisions relating to mental alienation have of late years, both in this country and in Great Britain, shown a truly progressive spirit, although they are here and there interspersed with dicta of which it is difficult to speak with respect; but yet much, very much, remains to be done before Law will walk abreast of Science. That such a tempest-tossed wreck of a mind as Mrs. Fillmore's is described to be was capable of any really intelligent action, it would be impossible to make any true alienist believe. Swayed by manifold delusions, probably by many unknown hallucinations and illusions, confused in what perceptions she had, unstable of mood, reacting violently to a myriad slight outward and inward causes, the bearer of a fatal arterial disease that deprives her of the use of limbs and speech, and probably of the little intellect left, and that finally kills her—why, if such a mind as this is to be permitted to dispose of property, let us save much useless expense to the State and individuals by altering the statutes so as to read: "All wills admitted to probate except those of slobbering idiots and raving maniacs."

FURTHER PROCEEDINCS.

The discussion on the paper of Prof. Landon Carter Gray being postponed till the next meeting of the Society, Dr. H. Howard, of Montreal, Canada, asked leave to make a few remarks on it, as he would not be present at the next meeting. He said, I beg to congratulate Prof. Gray on his admirable report of the case, and as it is too late to discuss it in detail, I would simply say that at first I was surprised to find that any judge or jury could be so stupid as not at once to have seen that the testator was insane, simply judging her by her conduct.

But my surprise soon vanished when I learned that the property was left in *trust* for religious and charitable purposes. For I have invariably found that the strongest proof that can be given to a judge or jury of the sanity of a testator is that they leave their property in trust for such purposes; and break nature's laws by neglecting to provide for those who have natural claims upon their benevolence.

These are the testators who, when their minds are weakened because of pathological defect in their mental physical organization, believe they can make a compromise with God for their past deeds; and it is strange that in such cases the trustees and all those interested in the testament never, by any means, can be brought to see that there was anything in the conduct of the testator which would lead to a supposition of insanity, although all disinterested persons would have no difficulty in pronouncing the conduct of the testator to be that of an insane person. It is a nice thing to be a trustee in these cases.

Within the past year I have been engaged upon a very similar case, where the heirs disputed their father's will, on the plea of insanity, and consequent incapacity to make a lawful will. The demented old man, over ninety, left his property in trust for religious and charitable purposes; then a large percentage to the trustee, the balance to go to the two sons. There was no balance.

It was proven in court that the old man had been for years squandering his money, in searching for gold, silver, and coal in a large lime-stone quarry, that he said his dead son had at various times come to him since his death, to tell him to sell the bull. That he had requested the girl working in the garden to take good care of the pitchfork, as he would require it again after he had risen from the dead.

It was also proven that his two sons were respectable, well conducted men, and that there never had been any misunderstanding between them and their father. Notwithstanding all this, the trustee gained the case, and the sons got what the blind man shot at—viz., *nothing*.

It is by no means an easy matter to discover whether a person is sane or insane. That is, whether their psychosis is the outcome of a physiological or pathological physical organization. I, whose duty it is to say who of those submitted to me for examination is sane or insane, that they may be sent to, or discharged from, an insane asylum, after an experience of twenty-three years, very frequently find great difficulty to decide as to whether an insane person has or has not recovered his sanity, yet the most ignorant jury that ever sat in a jury box, and a judge that knows no more of physical science than he does of the man in the moon, will not hesitate in giving a verdict as to whether a person is sane or insane.

I have, for some years, under observation a very pitiable case, gross injustice, under our laws. A man died, leaving a woman, the mother of his son, although she was not his widow, a good property forever, for the benefit of her and their child. In time the woman became insane, without having made a will. She was interdicted and sent to an insane asylum, and a trustee appointed to administer her property. Said trustee pays the expenses of the poor woman in the asylum, but the boy being nothing in the eye of the law, has as he best may to provide for himself. Now when this woman dies, no doubt but that her property will go to some religious community or institution, and the son be made a vicarious offering for the sins of his parents. This is the justice resulting from our laws having been based upon the a-priori or dogmatic philosophy of past ages.

I ask, could there be greater injustice, could there be a greater legal robbery? Is it not time to have physical science, in natural philosophy, the basis of law and social order?

Mr. Eller then moved that the chairman appoint three members of the Society, of which the Chairman shall be one, to act as delegates from this Society at the annual meeting of the Massachusetts Medico-Legal Society, to be held in Boston, in June, 1884. Seconded and carried, and the Chair appointed Mr. Eller and the President, Hon. Wm. Barnes.

The Society then adjourned.

Sixteenth Regular Meeting, June 12th, 1884.

The sixteenth regular meeting of this Society was held on Thursday evening, June 12th, 1884. The President in the chair. After the minutes of the preceding meeting were read, and by motion approved, the trustees reported that they recommended for election to active membership, M. J. McKenna, Esq., of the New York Bar; and that they would meet next at the residence of Dr. Spitzka, Sept. 1st, at 8 P.M.

The Committee on Publication informally reported progress, and that sixty copies of the "Proceedings" had been subscribed for, inclusive of the twenty-five copies taken by the Society, and that the $60.00 accruing therefrom had been turned over to Dr. McBride.

Jabez Hogg, M.D., M.R.C.S., F.R.M.S., of London, England, was then elected by acclamation, a motion to that effect having been made and carried, and Wm. McKenna, Esq., being balloted for, was elected unanimously, twelve votes having been cast.

Owing to the absence of Dr. Gray, which the Secretary announced, it was moved, seconded, and carried that the further discussion of his paper be postponed until the next meeting.

J. G. Kiernan's paper, entitled "Some Suggestions concerning the Dwight Insurance case," was then read by Mr. Sackett, and discussed by Dr. Spitzka, Mr. Benn, Ex-Judge Hull, Mr. Sackett, Mr. Russell, Dr. Jacobus, Dr. Stevens, Dr. Harwood, and Mr. Livingston.

PARETIC DEMENTIA AND LIFE INSURANCE: A STUDY OF THE DWIGHT CASE.

BY

JAS. G. KIERNAN, M.D.

THE Dwight case was a decidely complex one, and what, in my opinion, was the most important of its problems was not at all considered in the decision which terminated it. Whether Col. Dwight did or did not commit suicide to enrich his family seems to me to be a matter of subordinate importance. The reasoning adopted to prove that suicide is sometimes a sane act was not suited to its purpose, and, from a scientific standpoint, worthless. No alienist worthy of the name will claim that suicide *per se* is an evidence of insanity. Suicide, in a conscientious Roman Catholic, would be presumptive evidence of insanity; in a free-thinker it would be presumptive evidence of nothing. The individual is the proper means of comparison, not different races, as proposed by some solicitors of life insurance companies. Any act which is in full consonance with an individual's circumstances, education, and surroundings cannot, *per se*, be regarded as an insane or sane act; it has a negative value only. The issue of suicide raised in the Dwight case and made the main issue led to a waste of time and glorified "experts" who were hitherto unknown. As gleaned from very conflicting evidence, the facts of the case are as follows: Col. Dwight, a man of prudent habits, suddenly became addicted to extravagant speculations, evidently engendered by the existence of stupid delusions of grandeur. He, at the same time, presented evidences of organic brain disease. These speculations had almost reduced him to

bankruptcy, when he suddenly insured his life for $300,000 in various life insurance companies, dying, after one premium had been paid, his friend claimed, from the effects of a congestive chill conjoined with an overdose of morphine. The companies claimed that the Colonel committed suicide by strangulation. On autopsy, old and recent pachymeningitis with adhesions to the surface of the brain were found. The abdominal organs presented evidences of having been the seat of some malarial disease. There was noticed on the neck a peculiar mark which resembled that of a rope, but might have been produced by a tight necktie. To the alienist the history above given points to the existence of paretic dementia at a period prior to the time the Colonel first entered into these wild speculations. Under such circumstances, the question naturally arises, whether policies of insurance would have been secured by a paretic dement. What is paretic dementia? It is a very well-marked mental affection, easily diagnosed by a trained observer, but readily escaping the notice of laymen and the average untrained physician. The first stage is usually ushered in by emotional excitement, generally of an expansive type. The patient is hilarious, perhaps even boisterous. He is likely to make extravagant purchases or lavish gifts, his memory is not unlikely to be capriciously defective Carelessness in attire may suddenly present itself. On the other hand, the patient may suddenly become fastidious about the use of flashy attire. A patient in Chicago displayed this at his trial for insanity to such an extent as to be called the insane "dude." The patient, as in cases observed by Hammond, Lélut, Baillarger, Parot, Billod, Brierre de Boismont, A. Sauze, Maudsley, Burman, Fabre, Darde, Mickle, and Voisin, may commit theft in a stupid manner. I have observed cases in which theft was the first obvious evidence of the patient's insanity which was not recog-

nized until he had been tried and condemned to the penitentiary. In a case which recently occurred in New York, a man who was first arrested for stealing flowers in open day and in presence of a large crowd, was, upon examination, found to be suffering from the initial stage of paretic dementia. Le Grand du Saulle has been called on to determine the mental status of many paretic dements, the first observed symptom of whose disease was theft. If the patient be an officer in monetary trust, errors in his accounts leading to suspicions of embezzlement may occur. In most cases, as in two recently reported from New York, this is due to forgetfulness. Le Grand du Saulle reports the case of a cashier who suddenly became addicted to visiting places of ill repute, neglected his accounts and embezzled money, displaying soon after evidences of the third stage of the disease. Eroticism varying from tendencies to form improper marriages up to the wildest lasciviousness, as in cases reported by Guislain, may make its appearance. Moreau (de Tours) says that the sentiment of love in its ideal sense is very often the first symptom of this affection; the genital excitement appearing later. The first tendency is often noticed in hitherto fanatically orthodox Jews who suddenly contract marriages with Christians. In a case cited by Le Grand du Saulle, a man suddenly married a prostitute and legitimized by acknowledgment, according to the French law, her two children, dying soon after in an asylum. This sexual excitement may manifest itself in indecent exposure of person. I have observed the case of a hitherto respectable physician who suddenly indecently exposed his person; fined for this, he immediately exposed it on leaving the court room, and the fine was doubled, but he again repeated the offence. In consequence of this, he was committed to prison, and on his release he came to Chicago, where he was found to be a

paretic dement, dying in the Cook County Hospital for the Insane. Wild speculations may be suddenly entered into. In a case cited by Sankey, a paretic dement, whose mental condition had been hitherto unsuspected, suddenly rose in a meeting of stockholders of a concern on the point of bankruptcy and offered to purchase all the stock. In a case cited by Spitzka, a hairdresser bought up all he could find of a certain shade of gray hair. Le Grand du Saulle reports the following case: a physician well known in science had had for more than nine years an insurance of $20,000 on his life. He suddenly gave unequivocal evidences of mental impairment, went and came rapidly, and wrote and spoke a great deal. He had an exaggerated opinion of his labors, vaunted his success in practice, and boasted of his professional ability. In one of his walks he accidentally met the president of the company in which his life was insured. After a long conversation, Dr. Blank said that his life was assured for an insignificant sum, and that he had resolved to increase the amount to $100,000. He was referred to the proper authorities who consented. The policy was prepared and all that was needed to complete the assurance was a receipt for the same. The agent, who was ready to deliver the policy on the signature of the receipt, suddenly noticed, just as the doctor was about to sign this, that the latter talked rather freely and loudly; suspecting intoxication, he put off delivery of the policy until Dr. Blank should become sober, claiming to have forgotten some important formality. The following day, the physician was sent to an hospital for the insane, where he died in six months from paretic dementia. The company paid the $20,000 to his widow and esteemed itself happy that it did not have to pay the $100,000 for which the husband had desired, in a fit of pathological temerity, to assure his life. The delusions which may occur at this time, as a rule, are expansive in character. The

patient is immensely wealthy, rich, or strong. One of my patients, who was a little less than five feet high, claimed an altitude of ten thousand feet and a corresponding breadth. He was placed next a paretic slightly taller, and on being asked if the latter was not taller than he, responded that he was, but replied, in answer to the question how tall he (the first patient) was, ten thousand feet. The patient who claims to be King Brian Born will answer to the sobriquet of Michael Mahoney, and give the latter as his name in answer to a question to that effect. One of my patients, who had been a merchant, made a list of his property, consisting of patents, among which was a receipt for clam chowder; this he valued at a billion, and the other thirty-three patents from watches and railroads at one hundred millions. One of Hammond's patients owned all the trout streams in the country. The patient confuses the day dream with the actual. The delusions shift and vary. The man who is worth $1,000,000 to-day is worth fifty in ten minutes more. If contradicted, his delusions become exaggerated. The paretic dements, unlike the majority of the other insane, do not recognize the insanity of their co-invalids. In fact, one paretic dement often accepts another's delusions as a basis for his own. One paretic dement in the New York City Asylum for the insane was going to secure an immense increase of capital by marrying his daughter to a fellow-paretic dement.

Two ex-commission merchants formed a partnership involving several billion dollars. A gambler won millions from his fellow-patients and based his delusions on theirs. One patient, if corrected about his delusions, would call on a mysterious double for confirmation, and then answer in the capacity of this double himself. While giving vent to extravagant ideas of wealth, the patient may be able to give true accounts of his pecuniary circumstances if kept to the point by leading questions. While delusions of

persecution and depression are not the rule, still they may present themselves, and are as wild, vague, and absurd as the expansive delusions. The immoral tendencies already narrated will frequently serve as a guide to diagnosis in some cases. The immoralities may long precede mental or physical symptoms. The sudden development of destructive tendencies and arson should generally lead to a suspicion of paretic dementia. The destructive tendencies, often motiveless in the last stages, are in the early stages intended to serve as a preliminary for future constructiveness on a grand scale. The paretic burns down his house to save himself the trouble of tearing it down, as a preliminary to a grand building. These patients manifest great wandering tendencies and are frequently lost or turn up miles distant from their homes. A paretic dement may become litigious, and when aided by an unscrupulous lawyer may for a time persecute his neighbors with frivolous suits. The insane basis of these is very early determined, and the patient non-suited. As a rule, however, the paretic's purposes shift too much to be carried out.

There is usually detectable a tremor of the lips or the tongue, or a difficulty in articulation. There may be disturbances of the gait. Mental confusion, coma, an epileptic or apoplectic convulsion or maniacal outburst may now occur, ushering in the second stage of the disease. Here the motor symptoms are the first to attract attention. As has been pointed out by Baillarger and others, the maniacal outburst may mask all these symptoms. There is at times dysphasia or labial and lingual ataxia. The patient fails in pronouncing labials and linguals, perhaps utters the word after an effort, loudly. There is often present at the same time a convulsive or tremulous twitching of the upper lip. There may be fibrillar tremor in the tongue and often a deviation of it to one side. It is suddenly jerked in and out. Grinding of the teeth is not uncommon. The pupils may

present a pin-hole contraction late in the first stage or early in this, but as a rule they are unequal and at times dilate irregularly. The patient has less control of his hands, and if his occupation be one requiring delicate manipulations, it has to be abandoned. The handwriting is changed in character; if previously firm it becomes shaky and irregular. As has been shown by Dr. Bacon, the letters are badly shaped.

The gait may be impaired. The gait may be more or less jerky, the steps long, limbs thrown forward, the movements hurried and made with effort. When paresis is markedly predominant, the gait is slow and unsteady, and the widely separated feet trip at inequalities. Sometimes the ataxic speech and the normal gait are in sharp contrast. A new York alderman, at one time under my charge, while unable to articulate, was able to dance as well as he ever had been.

Persons engaged in occupations requiring ability to form combinations of color, may, late in the first stage or early in this, give evidence of color-blindness. Two purchasing clerks in the employ of a large dry-goods firm, who became paretic dements, lost their positions through the sudden development of color blindness. Batty Tuke and Boye have reported several cases of this kind. Voisin has found that at this stage there is a loss or diminution of the sense of smell. I have seen cases in which the sense of smell was increased at this stage, to markedly and suddenly diminish in the next. As Mickle remarks, hallucinations of the sense of smell are rare. The mental symptoms present themselves in the form of an expansive delirium, or in acute maniacal excitement, or in hypochondriacal manifestations, or, in rare cases, in the form of stupor, or finally in the form of "circular" manifestations. As Spitzka has said, most of the mental phenomena proceed from the fact that the patient has lost his proper self-

consciousness. Billod and Salomon have advanced the view that the mental confusion of the patient is such that he fails to distinguish between his beliefs and his desires. In the English-speaking patients a curious difference is noticeable. The Englishman expresses his extreme contentment with this physical condition with the statement that he is "all right." The American, apparently more contented, uses the stronger expression that he is "first-rate." This reply, when made by a suspected lunatic, may give a slight hint of the possible existence of paretic dementia.

The speech in the third stage is much more imperfect. There is at times a great deliberation in connection with speech which, as Mickle remarks, is an attempt to surmount the difficulty. The appetite is good, even excellent, and the sudden appeasement of a seemingly good appetite in lunatics is sometimes, as has been shown by Dr. Workman, of value as a diagnostic hint. The remissions are of interest from the medico-legal and diagnostic standpoint. They furnish one of the numerous stumbling-blocks for the dilettante alienists who infest our courts. Sauze describes them as of three kinds. Those in which there is remission of the mental and physical symptoms simultaneously, those in which there is remission of the mental symptoms alone, finally those in which there is remission of the motor symptoms alone.

Mickle found the first two types common, but the third he had never observed. As has been pointed out by Baillarger, there is, as a rule, an amelioration of the mental symptoms, the motor symptoms persisting. This has always been the experience of Bayle, Ferris, and Rodriguez. Lubinoff and Doubtrebente have claimed that the remissions are sometimes complete restorations to health. Spitzka, Westphal, Mickle, and myself have seen but very rarely such complete remissions. Doutrebente and my-

self have found the speech-trouble least affected by the remissions. Lunier has reported a case in which seven remissions occurred; the case was of twenty-seven years' duration. The disease has a very bad prognosis, both as to life and recovery, as it causes death in, as a rule, from three to four years. The gross lesions usually found on autopsy are those already described in the Dwight case. Enough has already been detailed to illustrate the predominant characteristics of this disease. It will be obvious that intellectual powers of a paretic dement are such as would make him an easy victim of the blandishments of any "sharp" insurance agent who would believe him, from his apparently excellent health, to be a good risk. Once started in the life insurance direction, the paretic dement would keep on, like Le Grand du Saulle's patient, increasing the insurance on the life of the valuable citizen he believes himself to be, since paretics have a tendency to adopt and extend ideas derived from others, as is shown by the case cited by Spitzka of the paretic dement who, saved by his wife from a paretic suicide, proposed to erect a monument to her for saving the life of so valuable a citizen. It is curious how often this psychosis escapes observation by the non-alienist physician and laymen, when compared with the ease with which it is diagnosed by even asylum attendants familiar with it. The two cases (already cited) as occurring in New York State were two cashiers of banks who had been paretic dements for at least two years, and had nearly brought the bank to a condition of insolvency by simple lack of attention to business; their mental condition had not been at all suspected by their business associates. In Chicago, a saloon keeper with a paretic delusion of having inherited $2,000,000, was interviewed by the reporters of every paper in the city, by none of whom was his mental condition suspected until his friends took measures to have him placed under treatment in the county

hospital for the insane. There is, therefore, nothing antagonistic to the existence of paretic dementia in Col. Dwight in the fact that he insured his life for the amount stated, and that his mental condition escaped observation from the business men of the companies. It may, however, be urged that the medical officers of the companies would detect the psychosis. He who knows how these medical officers are chosen, either from relatives or connections of officials of the companies, or by agents who tell the physician that "he must not be too strict,"[1] or for political reasons to influence State legislatures, from medical politicians[1] who indulge in graveyard insurance in which they get caught sometimes, but not as a rule, will scoff at the idea that men like these, who neither know nor care to learn anything of psychiatry, could be of value in the detection of insanity. Even in France, where the physicians are supposed to be better trained than the graduates of our diploma factories, the one case cited shows the value of non-alienist medical examination, and the same point is still more strongly illustrated by another case cited by Le Grand du Saulle: two brothers presented themselves at the office of a French alienist. The elder entered the office first and asked the alienist to examine with care the patient brought him. "There seems to be nothing the matter with my brother," said he, "but he is no longer the same." The physician, after a long examination, said: "Your brother is in the initial stages of paretic dementia." Explanations were then given, and the prophecy made that the patient would die in three or four years. The following day an insurance of $20,000 was placed on the life of the patient. Three years after, the brother pocketed the amount. In Germany, a medical officer of a railway corporation stated the symptoms of paretic dementia presented by a forty-three-year-old man were only changes

[1] Actual occurrences in Chicago.

due to old age. Hanot,[1] in a recent paper, calls attention to the dangers life insurance companies are exposed to from this class of patients who, as already stated, escape the diagnostic ability of the average insurance company physician. It will be obvious that the average untrained physician is worthless in the detection of this psychosis, and with all these facts before him, the alienist will not hesitate to say that Col. Dwight was a paretic dement when he effected the insurance on his life; whether he committed suicide or not is foreign to the real question in the case. Is an insurance effected on the life of a paretic dement, by himself or his relatives, in good faith, binding on the company making such assurance? The Supreme Court of Iowa[2] has decided that persons of unsound mind are to be held bound by an executed contract or conveyance where the transaction is fair and reasonable and in the ordinary course of business, and where the mental condition of the party is unknown to the second part and the parties cannot be placed in *statu quo*. The converse of this necessarily follows. A paretic dement cannot be guilty of fraud, for fraud implies a knowledge of the true state of things, and of such knowledge the paretic dement is destitute. Col. Dwight effected an assurance on his life because he was a paretic dement. If contracts with the insane, under the circumstances mentioned by the Iowa decision, are binding, then his policies were binding on the company. If the policies were binding on the companies, no suicide by him could vitiate them. It may be admitted that, even assuming the truth of all the circumstances, it was an injustice to burden the companies with the results of the actions of an insane man. With the consequences of a law a judge has nothing to do; his duty is to declare what that law is, and the same holds good of a

[1] Annales d'Hygiène, 1883.

[2] Northwestern Reporter, June 18th, 1881.

scientist and scientific truth. The companies were themselves to blame for accepting such a risk—a risk offered by the would-be policy holder in good faith. It may seem hard on the companies, but it would also be hard on the family of other paretic dements if they should, in consequence of the precedent set in this case, be deprived of the provision made for them. The life insurance companies use all means to detect fraud and to ascertain the value of risks. If such means prove insufficient, not through fraud of the policy holder, but through the incapacity of the company's agents, the company should be held responsible for these reasons. The present writer believes that the decision in the Dwight case was fully warranted, even supposing the deceased committed suicide. Another aspect of the case presents itself. Supposing Col. Dwight, a paretic dement, insured his life, and then, with a paretic idea of smartness, committed suicide to compel the company to suffer for some imagined affront or with the vague idea of making money for his friends, would his act vitiate his policy? Under the Iowa decision, the writer believes not, but would not like to express an opinion as to the abstract justice of such a decision. Legally he believes the policy could not be declared void, however seemingly unjust its non-voidance, or rather the full requirements of all its provisions, under the circumstances, would be. The question simply resolves itself into this: Can a contract which *per se* involves an element of risk, all means of diminishing which risk are supposed to be taken by one of the persons making the contract, be regarded as void because, without fraud on the part of the other person making the contract, the risk proves greater than was anticipated? Life assurance contracts are based on the theory that the company ascertain the exact condition as regards disease. If the assured have an ordinary physical disease unknown to himself and the examiner, and die

from such disease, the company is held bound to pay the amount of the policy. It would seem that the same rule should hold good in the case of a paretic dement. The present paper has been written simply to raise this question for discussion. The writer believes that the policy and stockholders suffered unjustly in the Dwight case from the inventive stupidity of agents and medical officers, and from the legal advisers making a fight over the question of fraud, where one should have been made on the questions of contracts with the insane.

EDITORIAL ITEMS.

The Corpus Callosum, its Structure and Function.—Prof. D. J. Hamilton, of Aberdeen, made a communication to the Royal Society recently, upon the structure and function of the corpus callosum, which presents a number of new facts. The view which has been taken of the corpus callosum, and which is presented in all the text-books, is that it forms a great band of association fibres between the two hemispheres of the brain, corresponding regions of both hemispheres being united by white tracts passing through it. The view presented by Prof. Hamilton differs from the commonly accepted opinion. It is founded upon a series of observations made upon successive series of sections of the entire brain, prepared after a method described about a year ago by him in *Brain* (July, 1883). The summary of his results is as follows:

"1. The fibres in the tip of the frontal lobe run almost directly backwards. A short way behind this they become concentrated in an oval-shaped area. This oval-shaped area still further back divides into three distinct bundles, and these bundles I have named the *tractus internus*, *tractus medius*, and *tractus externus*.

2. The *tractus internus* becomes the corpus callosum and contains two sets of fibres, namely, (*a*) those coming from the opposite frontal lobe across the corpus callosum, and (*b*) those going from the frontal lobe of the same side. The fibres which come from the opposite frontal lobe anteriorly do not, after crossing in the corpus callosum, proceed to a corresponding situation on the other side, but after arching forwards, so as to circumvent the anterior horn of the lateral ventricle and the head of the caudate nucleus, turn back to form the *tractus medius* and *tractus externus*.

3. The *tractus externus*, further back, divides into the 'inner' and 'outer capsules,' while the *tractus medius* joins with the inner capsule shortly after it is given off from the *tractus externus*.

The fibres so derived from the frontal lobe of the opposite side are conducted along with the common fibres of the 'inner capsule' to the following destinations. Some of them (a very few twigs) end in the head of a caudate nucleus, while the bulk of them are destined to become attached to the thalamus opticus. One large mass derived from this source is the anterior peduncle of the optic thalamus (Vorderer Stiel, Meynert).

4. The callosal fibres derived from other regions of the cortex pursue a similar course: They sweep downwards into the corpus callosum, slant somewhat backwards or forwards when they enter it, pass over to the opposite side, and then, instead of becoming attached to a corresponding part of the cortex in the opposite hemisphere, turn upwards, outwards, and downwards, in a dense well-marked arch, and enter the inner and outer capsules. This mass of arched fibres I propose to name the *crossed callosal tract.*

5. The fibres of the opposite hemisphere, having thus become united to the inner and outer capsules, terminate in the following manner:—A few of them enter the head of the caudate nucleus, but by far the greater number become attached to the thalamus opticus opposite the bend or knee formed by the junction of the anterior and posterior divisions of the inner capsule. Those entering the outer capsule become attached respectively from before backwards with the following parts: the inner capsule, the olfactory tract, the temporo-sphenoidal lobe, and the optic tract. The olfactory and optic nerves are thus, I believe, connected directly with the cerebral cortex.

6. The corpus collosum, therefore, is not an interhemispheric commissure at all, but is the decussation of the cortical fibres in their progress downward to become connected with the basal ganglia. In the human brain I have never seen any fibres which pass directly from one hemisphere to another.

7. The 'corona radiata' as usually described, does not exist. The only fibres which pass from the cerebral peduncle directly up to the cortex of the same side are contained in the posterior division of the inner capsule. They correspond to those fibres which have decussated already in the anterior pyramids, and are a mere fraction of the whole 'inner capsule' fibres. All the other fibres of the inner capsule pass into the *crossed callosal tract*, and, instead of running directly up to the cortex of the same side, cross in the corpus callosum to the cortex of the opposite side.

8. The same arrangement prevails in the callosal fibres from the tip of the frontal to the tip of the occipital lobes.

9. The crossed callosal tract comes so near to the cortex of the

opposite side in arching downwards that injuries or stimulations of one side of the brain would be liable to affect the fibres coming from the opposite, and hence to produce a misleading result." Proceedings of the Royal Society, No. 230, 1884.

Researches upon the corpus callosum have not been recently made, and notwithstanding the many anatomical facts of late brought out by study of the brain, but little attention has been paid to this part. In Meynert's book the old view is advanced without question (Psychiatrie, S. 41). This communication of Prof. Hamilton will therefore be productive of further investigation as to the anatomy of the body, and the investigation may throw light upon its function. In a few cases in which the corpus callosum has been absent in man, idiocy has been present, and has been ascribed to this cause. Cases of disease of the corpus callosum are rare and no definite local symptoms can be ascribed to such a lesion. The obscurity which surrounds the subject must be cleared up by further study, and the communication of Prof. Hamilton is welcome as the beginning of a new investigation.

M. A. S.

Comments on the Callosum.—So far as observations have been made on the development of myelin in the fœtal and embryonic brain, they support the old view of OBERSTEINER and MEYNERT that the callosum unites symmetrical structures; thus Flechsig finds that the part of the callosum which first receives the white color is the very part which appears to unite the paracentral lobules of the two hemispheres (Leitungsbahnen, p. 34). Flechsig emphasizes the fact that the myelinic parts *appear* to come from the cortical field, mesad of the "Rolandic loop." The gradual extension of myelinic development, cephalad and caudad from the "paracentral associator" is in favor of a symmetrical connection throughout. Just as the occipital lobe outstrips the frontal chronologically, so the corresponding callosal districts differ; the *splenium* preceding the *genu* in the attainment of the white tint of maturity. A study of two young infant brains, while not yielding decisive results beyond those reported by Flechsig, as regards the callosum, seems, as far as it goes, to militate against the Aberdeen anatomist's views detailed in the preceding abstract. It is not *altogether* a new view. Some of the older anatomists attempted to explain some of the features of cerebral paralysis, on the ground that the callosal fibres decussated, while the objections to our modern views of capsular hemiplegia advanced by BROWN-SEQUARD have led to a reopening of that same question.

Were there decussating fibres in the callosum to the extent claimed, disease and absence of that body would not be so negative as to symptoms as has been the case in some well-observed instances. The idiocy, imbecility, and perversion exhibited by the majority of those born without a callosum is to be accounted for on the ground that the absence of this great commissure is associated with other defects of cerebral development. No one will seek in the cerebellum the seat of the *Psyche*, and yet there is grave psychical defect in all cases of cerebellar deficiency, because—as it is not otherwise conceivable—the cerebellar and, as in the case before us, the callosal defect is only an accentuation of a general "error of development."

The symmetrical loss of power observed in hemiplegia by CHARCOT and BROWN-SEQUARD, and confirmed by us in two cases of monoplegia, while explicable on the basis of the spinal commissures, is rather in harmony with the view that there is *symmetrical* union. The singular symmetry of some superficial cortical lesions seems to us to be too frequent to be fortuitous, and it is not at all impossible that a pathological sympathy is established by the callosum between opposite areas of the brain, as by the *commissura ansata* (?) between the two eyes. As far as the anatomy of the great intracerebral tracts is concerned, we have satisfied ourselves, abandoning earlier views—that the study of sections, and defibrillated specimens (by the younger Stilling's new method) must accommodate itself to the results obtained by Flechsig's method, which in their greater part, as relating to the *corona radiata*, appear to be incontrovertible. E. C. S.

Drunkenness as an Excuse for Crime.—Mr. John D. Lawson (*American Law Review*, April, 1884), in discussing the question of drunkenness as an excuse for crime, says that to the general rule, which is well established, that voluntary drunkenness cannot excuse or palliate crime, and evidence that the prisoner was intoxicated at the time is therefore irrelevant, there are several exceptions. A. Insanity produced by intoxication. B. Premeditation and deliberation C. Intent. D. Knowledge. E. Threats. F. Provocation. G. Self-defence. H. Involuntary intoxication. The first of these exceptions is fully recognized, even in England. The Tennessee Supreme Court, in the case of *Swan* v. *State*, 4 Hump. 136 (1843) held that "if the mental state required by law to constitute the crime be one of deliberation and premeditation, and drunkenness or other cause excludes the existence of such mental state, then the crime is not excused by drunkenness or

such other cause, but has not in fact been committed," and this same view has been held in other States. In Missouri and Vermont the opposite view is held. It has been held in England, Texas, Iowa, Minnesota, Wisconsin, Ohio, Louisiana, that evidence as to drunkenness is admissible as bearing on the question of intent. In Ohio and in the United States Courts it has been held that condition of the individual as to sobriety has a bearing on the knowledge of his crime. In England and Delaware it has been held that the question of drunkenness has a bearing on the relation of antecedent threats to the crime. In England and Georgia it has been held that the question of drunkenness has a bearing on the relation of provocation to the crime. In England it has been held that drunkenness may be taken into consideration in determining the question of self-defence. In Georgia the opposite doctrine is held. In Illinois it has been held that involuntary intoxication is a sufficient excuse for crime.

The Intra-Cerebral Course of the Hypoglossal Fasciculus.—It has been long known that a true paralysis of the tongue could be produced either by disease in the hypoglossal nucleus in the medulla, or by disease in the lower third of the anterior central convolution in the cortex. In 1882, Ross published some cases of lesion at various points within the brain, in the internal capsule, and in the centrum ovale, which had produced during life a labio-glosso-pharyngeal paralysis. During the past three years, numerous similar cases have been recorded, and in the *Archives de Neurologie* for March and May, 1884, Drs. F. Raymond and M. Artaud have collected and analyzed these cases. They find that a true glossoplegia, attended by paralysis of the muscles of articulation and difficulty of speech, may occur from disease at numerous points in the brain; and, having arranged the cases collected in a series, according to the position of the lesion, they have succeeded in tracing the course of the fibres which join the cortical centre of the tongue with the hypoglossal nucleus in the medulla. The course of the fibres is as follows: from the cortex of the lowest part of the anterior central convolution, the bundle of fibres passes inward, arches over the lenticular nucleus a little anterior to its centre, and then descends in the knee of the internal capsule lying in its middle third, and anterior to the motor fibres which govern the muscles of the limbs, and which pass in its posterior third. Issuing from the internal capsule below, these fibres lie in the inner part of the middle third of the crus, and thence pass pos-

terior and internal to the fibres of the pyramidal tract, through the pons, in the lower part of which they decussate partially and turn downward to reach the hypoglossal nuclei.

A lesion at any point in the course of this tract will give rise to paralysis of the tongue, lips, and velum palati, and produce a set of clinical symptoms resembling a true bulbar paralysis. The history of the case, and especially the character of the onset, makes a diagnosis between the two conditions easy. In a glosso-labio-pharyngeal paralysis of cerebral origin, the sudden occurrence of the symptoms, and the usual accompanying facial paralysis or hemiplegia, together with intellectual defects, contrast strongly with the slow invasion of the true bulbar paralysis and the absence of cerebral symptoms with it. Inasmuch as the cortical centre of the hypoglossal nerve is bilateral (*i. e.*, each cortical centre governs both halves of the tongue), the symptoms are not unilateral in the bulbar paralysis of cerebral origin, and the entire tongue may be paralyzed from a unilateral lesion in the brain, as well as by a bilateral lesion in the nucleus.

The authors believe that the course of the hypoglossal tract differs from that of the aphasic tract, inasmuch as a lesion of the former does not always produce aphasia, even when located in the left hemisphere. Their position is strengthened by the fact that Wernecke has traced an aphasic tract which does not coincide with the hypoglossal tract here described. M. A. S.

An Unnoticed Feature of the Fourth Ventricle.—Observers are familiar with the fine striations present in the endyma of the ventricles, and particularly marked in the lateral part of the anterior half of the fourth ventricle, whence they converge towards the aqueduct. By Bergman they were supposed to represent a fibre system, termed by him *psalterium* or *organon pneumaticum*, and by Arnold as *pectunculus*. In the case of a three-month-old child, we found that these striations—regarding which it is not yet determined whether they are natural or results of hardening[1]—were connected with three white buttons constituting firm elevations of the lateral *fossa* of the ventricles, so that the three main striæ with the connected bulbous eminences resembled as many drum-sticks. The appearance was strictly symmetrical. In one negro, two on one side and a fusion on the other

[1] They are best seen in specimens that have been from twelve to thirty hours in bichromate of potash. It is possibly the transparency of the endyma that prevents their easy recognition in the recent state.

were very distinct. We propose the term *hordea ventriculi* for them. E. C. S.

The American Neurological Association.—The last meeting of this body was probably the most sensational and—as is usually a natural result with scientific bodies—the least productive of the ten reunions which are comprised in the first decade of its existence. The papers read, with few exceptions, were far below the average, and the discussions were either feebly participated in, or when they became general, descended to the level of the garrulity characterizing an ordinary medical meeting. We refer particularly to the discussion following Dr. Graeme Hammond's paper on the curability of locomotor ataxia, a singular feature of which was the claim of nearly all present to having witnessed one or more cures of this disease. A very favorable showing, if it be correct!

Certainly, nothing could be much more subtle than the theorization of the writer who developed the connection between the ovaries and the cerebral cortex, and who discovered the influence of ovarian cysts on the vaso-motor centres supplying the cortical cells, through the ensuing perversion of whose functions, the hemi-symptoms of hysteria became quite intelligible to the author; howbeit he neglected to reply to Dr. Putnam's well-timed criticism that the pseudo-focal symptoms of hysteria do not altogether correspond to the focal symptoms of organic disease of the hemispheres? Such cases as the one related, where oöphorectomy had been performed for severe hysteria, *without* producing a disappearance of the symptoms, should never be permitted to constitute the basis of a paper. The time of a society like the American Neurological Association is too limited to be taken up by such barren offerings. Nothing could well be more amusing than the reply to a criticism based on the fact that a sham oöphorectomy had cured severe hystero-epilepsy in Israel's hands than this, "I hold that these cases were not properly diagnosticated." Almost any absurd theory could be sustained, if counter-arguments were to be swept away in this patronizing way.

Dr. Putnam's paper on the functional disturbances following railway injury, and Dr. Birdsall's on external ophthalmoplegia, constituted the main practical contributions of the meeting.

As stated at the outset, the harmony of the meeting was marred by some sensational incidents. It is our painful duty to refer to these, as we believe our duty as journalistic critics, who are within

the Association, and friendly to it, requires an exposure of the system which was responsible for the unpleasant occurrence referred to. It appears that a candidate, who encountered some technical opposition last year, was again proposed at the session of this year by the President, Dr. Isaac Ott, and a former presiding officer, Dr. Hammond, Sr. No report was made on the candidate; Dr. Hammond called for the report; none was vouchsafed, and in the course of an acrimonious exchange of questions and answers, the Secretary confessed that he had voted against the candidate without reading the paper presented, and on which his qualifications should have been determined according to the by-laws.

The matter was postponed, and referred to the next council, of which the gentleman, whose personal opposition to the candidate had been so strangely manifested, was one. One member of this council was a proponent of the candidate, and from motives of delicacy abstained from voting. These motives apparently were not active elsewhere, and the new council failed to agree, and also neglected to report. The Society, however, took the matter out of their hands entirely, and by a vote of ten to eight elected the candidate, and repudiated the action of the council. We understood that a large number voted in favor of the candidate's admission, not because of convictions as to his personal merit, but from sympathy at the utterly inexcusable treatment to which he was subjected.

We trust that the dog-in-the-manger policy which has so nearly resulted in the disintegration of the local neurological society, and which dictated the partisan act of one of the officers of the national body, which we congratulate the latter for having repudiated, is now done away with, and that no other criterion will be applied to candidates for admission and office than that of their scientific fitness. To apply any other is to arouse sympathy for those who are unjustly dealt with, and thus to effect the admission—by a reaction of feeling—of those who might not have been admitted if only a proper examination of their merits were made.

We trust that next year the Association will be harmonious in every respect, and that its scope will be sufficiently appreciated by the readers of papers to prevent them from offering "statistics" from their private and dispensary practice, reporting cases that have been imperfectly examined, experiments that do not permit of any inferences from them, in short, not to fall into the errors rampant at our District and State medical societies. E. C. S.

Punishment of a Brutal Asylum Attendant.—James Brown, an attendant at the Utica State Asylum, was found guilty of homicide on the 27th of June. He was accused of causing the death of Evan D. Hughes. It will be remembered that, at the coroner's inquest, the medical manager of this institution endeavored to make it appear that the attendant named had merely fallen on the victim. The jury seem to have been but little impressed with this ingenious representation. A motion was made for a new trial, but denied, and Brown has been sentenced to two years' imprisonment or the payment of a fine of one thousand dollars. We believe that in this instance the ends of justice were met, and our chief reason for this belief is the weakness of the "explanation" offered so consistent with the general atmosphere of secrecy and misrepresentation which is made to surround the inner transactions of the Utica stronghold.

* * *

Utero-Ovarian Diseases and Insanity.—The knowledge of the relations between the female diseases and the psychoses have been much obscured by the doctrinaire views advanced on the one hand by gynæcologists, and on the other by alienists. Researches like those of Danillo and Ripping have tended to clear up the subject somewhat, and additional observations are always welcome. Dr. Margaret A. Cleaves, superintendent of the female department of the Harrisburg, Pa., lunatic hospital, who entered upon that position with a gynæcological bias, says in a recent report: "Statistics thus far accumulated will not warrant the statement that either the mental recovery or improvement is attributable to the relief from the special disorder, yet it is rational to suppose that it has some effect, and that these patients have been placed in a better physical condition thereby than would have otherwise been attainable. My additional experience, although yet too limited to be sufficient criterion, does not confirm me in the *hope* which I had that the number of recoveries would ultimately increase. The work of a series of years might bring about different results. Briefly formulated, my conclusions then are as follows: that a large proportion of women in insane hospitals have some form or another of utero-ovarian disease; that many of those under treatment make marked mental and physical improvement coincidently with the improved local condition; that in a majority of cases, however, this improvement, owing doubtless to the long standing of the combined physical and mental disorder, only reaches a certain point, beyond which it seems

impossible to make further gain. And further, if the special attention is productive of no untoward effect, and in the large majority of cases it is not, it should be skilfully and faithfully administered. The principle involved is a right one. It is rational to believe that the improved physical condition of those discharged recovered and improved, produced by their relief from from the special trouble, renders them better able to meet and cope with the disturbing influences of life than they would otherwise be. And further, the lives of many women in hospitals are thereby rendered more comfortable and tolerable." That such a standpoint is the correct one there can be no doubt. It is a scientific one equally removed from the theatrical experimentation of the gynæcologist and the indolent laissez-aller policy of the routine insane hospital officer.

Military Drill in the Treatment of Insanity.—Dr. A. M. Shew (Report of the Connecticut Hospital for the Insane, 1883) states that military drill among the male patients was begun in that institution eight years ago. Its influence is perceptibly beneficial in cultivating habits of regularity and precision, and in counteracting the tendency to repose or inaction which is a distinguishing characteristic of chronic melancholia and dementia. From a psychological standpoint there can be no doubt that the effects mentioned would be produced, and that these would be beneficial.

Attendants in Hospitals for the Insane.—It has been and is customary in many publications to lay stress on the shortcomings of attendants in hospitals for the insane. In a general way it may be stated as an established fact that the character of the superintendent who is endowed with the power a superintendent should have, is the cause of the shortcomings of his subordinates. Dr. C. Macdonald, of the Auburn, New York, Criminal Hospital for the Insane, does no more than justice to a very deserving body of men when he states (Report for 1883): "The good attendant must necessarily possess superior and peculiar qualities of head and heart to enable him to acceptably discharge the numerous and trying duties incident to his position. He must be prepared to perform offices of a repulsive nature, and which are not seldom rendered difficult and more repulsive by reason of and opposition which insane persons frequently offer to efforts in their behalf. It not unfrequently happens that on unlocking them in the morn-

ing several patients on a ward are found to have soiled not only themselves, but their bedding, and even the floors and walls of their rooms with their excrement. Such patients must be bathed, their underclothing and bedding changed, and their rooms cleansed and put in order before breakfast, a kind of work which, to say the least, is not conducive to appetite; again, attendants must not only consent to serve long hours for comparatively small wages, but must exercise control of temper under the widest range of provocation, embracing insulting and abusive language, groundless accusations, and even assaults, on the part of patients, endangering both life and limb. They are constantly reminded by the medical officers that to strike a patient is one of the gravest offences, and which, if proven against them, will lead to instant dismissal with forfeiture of a month's pay; that they must constantly bear in mind that patients are irresponsible beings, against whom they must harbor no ill will, but must feel and act as kindly toward the most disagreeable patient as they do towards those that are pleasant and agreeable. While it occasionally happens that an unsuitable person succeeds in obtaining employment as an attendant, despite the rigid scrutiny to which applicants are subjected, and a constant endeavor to select from among those who seek to enter the service only such as are apparently possessed of the qualifications which are necessary to enable them to discharge the arduous, trying, and often thankless duties that fall to the lot of an asylum attendant, it may truthfully be said that instances of brutality on the part of attendants are exceptional, infrequent, and of short duration. On the other hand, it may, with equal truthfulness, be said that the majority of asylum attendants are painstaking, faithful to their trusts, and merit public confidence and esteem, instead of the distrust, misrepresentation, and hasty condemnation which are so readily, and often wrongfully bestowed upon them. Instances of heroic, self-sacrificing devotion to duty on the part of attendants are frequently witnessed by the medical officers of asylums, while, from the nature of things, the general public can have no adequate appreciation of the perplexities and trials that must daily be encountered by attendants in the discharge of their duties." The experiment is being tried in England, and with apparent success, of interesting the attendants in the scientific aspects of the cases of insanity under their charge, and there can be but little doubt that this works for the benefit of the patient in two ways. It relieves the tedium of the attendant's life by investing it with an interest in scientific pursuits that prevents fatigue and monotony, and leads to increased power of car-

ing for the patients under charge; the attendant is thus led to call the physician's attention to manifestations of disease which would otherwise escape notice and treatment. The mere superintendent administrator is liable to have a set of eye-servants as attendants, for the reason that their work is divested of all interest by his ignoring the scientific aspects of the cases under his charge. *

Liability for Erroneous Commitments to Insane Hospitals.—In the case of Perenel versus Cummings (75 Me. *American Law Register*, January, 1884), it was held that in an action against physicians, for falsely certifying through malice and negligence to the insanity of a person, who is thereby committed to a hospital for the insane, and the pleadings raise the issue as to the sanity of such person, the burden of proof is on the plaintiff. In such an action, the falsehood and not the insufficiency of the certificates is the ground of action against the certifying physicians. Without statutary provisions to that effect, there cannot be a civil action for damages against a physician based upon the insufficiency of the method he pursued in reaching and certifying a correct conclusion. If physicians, who have certified to the insanity of a person, have not made the inquiry and examination which the statute requires or if their evidence and certificate is not sufficient to justify a commitment, the municipal officers should not commit, and if they do, it is their fault and not that of the physicians, provided they have stated facts and opinions truly, and have acted with due professional skill and care. *

Sanitation in Hospitals for the Insane.—A curious blunder in the construction of a hospital for the insane is reported by Dr. Margaret A. Cleaves, of the Harrisburg, Pa., Hospital for the Insane. A sewer was so constructed that it leaked *into the air shafts* through which air was driven by the fan into the wards. The ducts through which the air is forced into the bluidings have never been paved, are dark and damp, so that the air, in passing through them, deteriorates and is not delivered into the wards in the pure condition that it should be. There is a very decided field for sanitary supervision in many hospitals for the insane. *

Dalton's Surcingle.—It is now a few years ago, that Professor DALTON informed the neurological world at large and the

English, New York, and Brooklyn medical publics in particular, that he had made a highly important discovery, or rather had rediscovered a body which had escaped the attention of recent anatomists. In fact, so important did the "discovery" seem, that three different articles in as many journals were published on the strength of it. We confess that, attending the meeting of the Academy of Medicine before which Professor DALTON announced this remarkable result of his researches, we were not a little disappointed to find that we had listened to an exceedingly lengthy description of an old friend who, under the beautifully simple name of the *tail of the caudate nucleus*, had been demonstrated to us by our teachers over and over again, little attention being directed to it, except as an exemplification of certain mechanical factors of cerebral architecture, altogether ignored by Professor Dalton. It was served up by Professor DALTON with a new sauce, purely nomenclatural in character, as the "surcingle," and doubtless Professor DALTON's ambition is satisfied by his citation, in a wonderful product of the binder's, printer's, and scissors' combined activity: "The Applied Anatomy of the Nervous System," as making original discoveries in the field of brain anatomy instanced by this resurrection. In order that our readers may share the surprise which Professor DALTON must have experienced at this citation, we will proceed to recite a few facts.

BURDACH, who in the earlier part of the nineteenth century occupied much such a position as MEYNERT does in its latter half, published a work on the Structure and Vital Phenomena of the Brain,[1] in 1819. In paragraph 176 of this unequalled treatise, the following lines can be found by those who will search: "Thus the corpora striata[2] finally separate posteriorly to the extent of nearly two inches by the insinuation and inclosure between them of the thalami optici. This part, which resembles the neck of a (the) retort: the tail of the corpus striatum (*cauda corporis striati*) is posteriorly two lines in width, and not quite as much in thickness, extends with upturned convexity along the external edge of the floor of the lateral ventricle where this forms an angle with the roof (of the ventricle), and along the outer margin of the thalamus, extending but a few lines further backwards than the latter, is then reflected backwards and downwards to run forwards along

[1] Vom Bau und Leben des Gehirnes, Leipzig; the first volume appeared in 1819, the second in 1822, the third and last in 1826.

[2] Burdach separates the lenticular nuclei (§ 179) under this name, and retains corpus striatum for the caudate nucleus.

the roof of the inferior cornu, and may be traced to the apex of the inferior (temporal) lobe."

DALTON gives the impression that all references to the tail (his surcingle) are antiquated, if not obsolete. If he had even the remotest knowledge of Burdach's work, he would have hesitated to include the discoverer of the *funiculi cuneati* under the fossil group. This is the same Burdach, by the way, of whom the French translators of Huguenin say:[1] "C'est ainsi, pour ne citer qu'un exemple, que la nomenclature et la topographie cérébrale de Burdach (*capsule interne*, *capsule externe*,[2] etc.), nomenclature relativement ancienne (1818–1826), a été dans les dernières années reprise, même en France (Charcot), et est devenue la base des *notions les plus élementaires* sur la localisation des lésions de la substance blanche des hémispheres."

Fortunately, the above lines were not written *after* Professor DALTON published his discovery, or the writers might have been accused of indelicacy in charging so distinguished a cerebral anatomist with a lack "of the most elementary notions," necessitating the painful process of working them out for himself, when they were the common property of his colleagues.

But we need not go back into ancient history to find better though shorter descriptions of the tail of the caudate nucleus than DALTON has furnished. In 1870, there appeared a work not unknown to the medical public, familiarly spoken of as "Stricker's Histology." In this work, the most extensively cited chapter is "The Brain of Mammals," written by Theodore Meynert, a Vienna psycho-physiologist, whose name is a household word, not with Germans alone, but to English, French, Italian, and, through Putnam's translation, to American students. It was at the time of its appearance and to a great extent still is considered the starting-point in modern cerebral anatomy. On page 724 of the second volume of Stricker's collection, the following accurate description is to be found:

"Morphologically, the caudate nucleus, like an arch concentric with that of the (cerebral) hemispheres, is revolved around a transverse axis situated in the brain stem,[3] whose plastic expression is the transversely directed wedge of the lenticular nucleus, and of which the base looks outwards, the apex inwards. This relation

[1] Page ix. of their preface.

[2] The reference is very well meant, and generally true, but its accuracy is decidedly Gallic; Reil discovered or rather described the capsules before Burdach.

[3] Meynert includes the great ganglia and the insula in the "Stammtheil."

of the two ganglia is shown in Fig. 243. The frontal segment of the arch of the caudate nucleus which is situated in front of the lenticular nucleus[1] constitutes the massive head; the segment appertaining to the occipital *and temporal* lobes, the attenuated tail. Besides the transverse and the arch-shaped ganglia of origin of the pes, pedunculi are fused by the junction of the caput (of the caudate nucleus) with the third articulus of the nucleus lenticular, *as well as at the temporal end of the arch of the caudate nucleus.* . . . The fusion of the temporal end of the cauda (of the nucleus caudatus) occurs immediately behind the *nucleus amygdalæ*[2] with the temporal process of the third articulus of the lenticular nucleus (pedunculus nuclei lenticulareas)."

If Professor DALTON had ever looked at this treatise or its translation (which he seems to claim having done, by referring to Meynert in an off-hand way), without reading or understanding a line, he would have found a capital illustration (Fig. 233, p. 703) of a sagittal section of a monkey's brain in which the caudex of the nucleus caudatus is represented at the roof of the inferior cornu.

It is scarcely necessary to refer to BITOT and FOREL, authors whose magnificent and correct illustrations all do full justice to the tail, and who show that about the time when DALTON made his epochal discovery it was in reality a familiar fact to competent anatomists generally, though naturally much ado was not made about a physiologically unexplained and probably inert morphological feature. We expressed ourselves to this effect, in the discussion at the Academy, having only the year before identified it in the cat and sea-lion.

Now what we wish to find out is to what period Professor DALTON refers in speaking of the surcingle as having become buried in oblivion. When did the tail of the caudate nucleus become lost to science, since the days of Malacarne who discovered it in the year of the Declaration of Independence? It certainly was amply discussed and well understood in the earlier decades of this century by REIL, DOLLINGER, and BURDACH; in those next following, by GRATIOLET and his cotemporaries, and in the present decade and the one immediately preceding, by MEYNERT, FOREL, and BITOT. To us it seems that at no time, since Malacarne, was the tail an inaccessible fact to those familiar with the anatomical literature of the day, and not the least significant

[1] Figure references omitted.

[2] Not to be confounded with the cerebellar lobes known as amygdalæ, nor with the *nucleus amygdala formis* or *Body of Luys in the Regio Subthalamica.*

feature about the mechanism of Professor DALTON's claim to resurrectionist fame is that he makes a louder proclamation of the alleged rediscovery than the original discoverer ever dreamt of making.

WILDER has been evidently misled by Dalton's claim. In suggesting CAUDA STRIATI as a nomenclatural innovation,[1] he was evidently unaware that Burdach and Meynert use the term "cauda" repeatedly, and that DALTON neither discovered nor resurrected any fact in connection with this part of the caudate nucleus. WILDER says that he has reluctantly been compelled to propose *cauda striati*, as DALTON declined to abandon *surcingle*. It is scarcely necessary to await DALTON'S abandonment; his resurrection has not ruffled the surface of progressing cerebral anatomy; it cannot pass into oblivion, because it never was recognized, except in that class of writings which are sufficiently defined by citing, as an example, the "Applied Anatomy of the Nervous System" already referred to.

Cauda is the old term sanctioned by usage (REIL, BURDACH, MEYNERT, FOREL), it is descriptive and in the international language of science. The appending of "striati" is, in accordance with Wilder's views, not essential and to some extent misleading, as the term "corpus striatum" is or rather has been used in two different meanings, one making it include the lenticular nucleus, one limiting it to the caudate nucleus, not to speak of an older obsolete, but descriptively accurate classification,[2] which made of the caudate nucleus the capsula interna and the lenticular nucleus three striate bodies without any regard to ganglionic characters. Certainly the caudate nucleus presents striation less markedly than the lenticular nuclei, and even than the thalami; its caudal prolongation is a more distinctive and peculiar feature than its fibre striation; a fact evidently determining Wilder's very proper selection of "caudatus" as the descriptive term.

Lest we may be supposed to have been unduly severe on the individual writer criticised in the above, we may be allowed to add that the instance here referred to is not the only one in which he has "discovered" familiar facts of cerebral anatomy, which might have been as readily unearthed in text-books. It is but one or two years since that Dr. Dalton "discovered" and published the discovery of a white line in the calcarine fissure, which was known to science a century before (VICQ D'AZYR), and carefully

[1] A Partial Revision of Anatomical Nomenclature, with especial reference to that of the Brain. "Science," ii.

[2] Vieussens.

studied morphologically and histologically by a small army of observers, whose writings Professor Dalton had certainly not familiarized himself with, or he would not have—comically enough as it happens—reserved his opinion as to its nature and signification.

E. C. S.

The Utica Alienists on Primaere Verrueckheit.—The Guiteau trial has had beneficial results in at least one respect. "Alienists," made so by the grace of politicians, learned something of psychiatry. The most curious and interesting result from a psychological standpoint is the effect produced on the Utica School, by the scientific revelations made by some of the expert witnesses for defence at that trial. Dr. J. P. Gray, in a paper read before the Association of Medical Superintendents of Hospitals for the Insane at its last meeting, after reiterating the doctrine that disease could not be inherited, said: "The question of inherited mental and moral traits is quite another field, and evidently outside of the region of disease. It is complicated and interwoven with the environment of the child from its birth; its domestic surroundings and the example of its parents from infancy, both through their own lives and the lives of their associates; in a word, the educational influences in the widest sense of the term. To this field belongs what is called the heredity of crime and of intemperance. These vices and criminal lives are simply the outgrowth of education, examples, appetites, and passions, and do not proceed from any inherited criminal tendency. Intemperance is not disease, however potent it may be in producing disease. Intemperance is simply vice. Few men of experience in the world but can recall families of drunkards. So we may recall families of smokers; it would be as logical to apply to this habit the doctrine of heredity, in the form of an inherited tendency, as it would to the liquor habit. In the plea of insanity for criminal acts, heredity has, perhaps, figured more conspicuously than any other element or agency in defence of crime. It has been held as a sort of underlying mal-influence inherent in the very constitution, liable at any moment to break out; a general larvated state of body and mind, the "latent diathesis" liable to develop at any time; and this has too often been made to serve as a reason for the possible existence of insanity in any particular case. Heredity is strongly urged in what are called cases of moral insanity. According to its advocates, a sort of moral scrofula pervades the emotional nature dominating the sentiments, and perverting or obliterating the moral sense. It is even claimed that the indi-

vidual, under these circumstances, is unconscious of this state of things; that his intellectual nature is not only not involved, but does not recognize the 'nature and quality of his acts' and, of course, 'cannot know that they are wrong.' This plea has been urged in all kinds of cases and for a great variety of criminal acts, such as book stealing by ministers, pilfering by school girls and boys, shoplifting by women of respectability, or in cases of reputable persons shooting under jealousy and revenge persons who have despoiled their domestic life or against whom they have grudges, real or imaginary. Incendiarism, burglary, and even forgery have come under this category. In most of theses cases the parents have not been insane and have led exemplary lives, and heredity cannot be predicated. Even Dr. Clouston, in his able and interesting 'Clinical Lectures on Mental Disease,' recently published, seems to embrace all those artificial classifications of the various forms of what he would call 'monomania' and 'moral insanity.' In his description of the origin of monomania he thus states the first out of four different ways in which he claims it arises: '1st. It is a gradual evolution out of a natural disposition, a proud man becoming insanely and delusionally proud, a naturally suspicious man passing the same borderland with his suspicions. There is usually a hereditary predisposition to insanity in those patients. The disposition may in fact be regarded as the nervous diathesis out of which the mental disease springs.' It seems to me impossible to put scientific and intelligibly consistent meaning into such language as this. What is a gradual evolution out of a natural disposition in any physiological sense? How does a proud man become 'insanely and delusionally proud' without the physical changes that imply the disease of the brain? For this is what he seems to insinuate when he says 'the (natural) disposition may in fact be regarded as the nervous diathesis out of which the mental disease springs.' He clings to the term 'mental disease' with a tenacity worthy of the old days when insanity was regarded as an actual disease of mind. But if pride and suspicion and other unamiable traits are a 'nervous diathesis' evoluting into insanity, who is safe and how are we to account for so large a proportion of cases in which the insanity first exhibits these traits preceded by no such 'nervous diathesis?' How can a 'disease' in any scientific sense spring out of a natural disposition, under the name of a 'nervous diathesis?' The 'insane diathesis' or 'insane temperament' as he elsewhere calls it, for illustrations of which he refers us to the 'works of the modern psychological novelist' [The trifling fact that Dr. Clou-

ston does not do this need not impugn Dr. Gray's veracity], he differentiates from the German *Primäre Verrücktheit* or natural fool by saying that 'the latter is an insanity naturally evolved in early life from the original constitution of a brain which may have been at first without peculiarity, but gradually inevitably and without any other cause than its own natural evolution, an unsound state of mind is developed without preliminary explosion of brain storm in the shape of an attack of mania or melancholia.' Perhaps, however, the latter is not more fanciful than the former. It has not even been proved, as yet, that idiocy is any such evolution from a hereditary 'diathesis;' and what the words gradually, inevitably, and without any other cause than its own natural evolution can really signify, other than a metaphysical speculation of the author, it would be difficult even to conjecture. The German writers on this subject exhibit a wonderful clearness and ingenuity in word manipulation, but one of their number, conspicuous for clearness and ability, Professor Arndt, gives us a clew out of the labyrinth of *Primäre Verruecktheit* when he says 'If a state of psychical debility is unmistakably manifest already during the evolution of psychical life or, as commonly expressed, is congenital, it is called "congenital dementia" or "idiotism."' ('Lehrbuch der Psychiatrie,' 1884.) Here then we are brought face to face with an entirely different department, that of congenital defects, malformation, or arrested physical development which are not classed in the category of active disease, and which at least have nothing to do with the positive access of the disease called insanity. A congenital defect, structural or otherwise, does not necessarily constitute a morbid process. Hence, the hospital practice of our day does not attempt to include the idiots and the insane under the same system of care and treatment; that of idiocy being chiefly directed to such development of its subjects as is attainable by education and training—a school system with physical training. Insanity is always an acute or supervening disease, however speedily its character may become fixed, and it always has for its origin a definite point of departure. Natural defects may enter into medico-legal questions of personal responsibility, but it is not because they have any medical or pathological connection with the active or acquired disease of insanity." There is the usual ostrich-like subtlety of the Utica School shown in this article, but Dr. Gray is not as skilful as usual, else he would have not placed himself on the defensive, but would have adhered to his old belief in the French proverb: "*qui s'excuse s'accuse.*" Were Dr. Gray an ingenuous man, he would define for the benefit of

alienists the antithetical (as he uses them) words active and acquired. He would also indicate the means of determining by physical symptoms alone, the differences between mental states psychically identical but dependent in one case on pathological, in the other on teratological conditions. Dr. Gray does not manifest that acquaintance with the writings of the earlier American alienists, which one would expect from an American nativist, who could indulge in the sneers at the Germans of the passages cited, else he would know that, as Dr. W. W. Godding (one of Ray's pupils) pointed out, these Americans recognized a condition inherent, born in the individual, a condition which writers have recognized under various names as hereditary mental disorder, insane diathesis, insane temperament.

Although abused for being an authority in a somewhat unprofessional manner, Dr. Clouston would hardly consider himself such on the subject of *primäre Verrücktheit*. Since Dr. Gray is aware that this term originated in Germany, he might have quoted from the writings of Snell and Sander and not cited a confusedly translated passage from Arndt as a satirical illustration of what "one of the clearest and ablest" Germans had to say on the subject. Dr. Gray is obviously preparing a means of retreat from the false position in which he placed himself by his absurd declarations at the Guiteau trial. Disease cannot be inherited, this is an established doctrine; insanity is a disease, ergo insanity cannot be inherited, but psychical conditions dependent on cerebral malformation are not insanity and hence may be inherited. There is everything in the way of putting things. *Mania transitoria*, as described by Schwartzer, does not exist, but "cerebral hyperæmia," as the Utica school of alienists have shown, whose symptoms are identical, does. Hereditary insanity does not exist, but a variety of idiocy, indistinguishable from it clinically by its psychical symptoms, does. Dr. Gray also indicates an intention of setting up the knowledge of right and wrong as a crucial psychiatrical test of insanity. Such use of this test has become epidemic among medical politicians. It is, however, obvious that the Utica school has learned something by the Guiteau trial, and when Bourbons like them learn, there is hope for all other medical politicians.

It is suggestive of the character of the Utica school that not a single follower of it ever used the term "*primäre Verrücktheit*" or "*originäre Verrücktheit*" until the Guiteau trial, when they evidently heard it for the first time from an opposed medical witness. It requires a trial, with its incident episodes of profit and loss, to

direct the attention of these gentry to the fundamental *dicta* of current science. We anxiously await further contributions from the same source and would suggest as a theme: The Insanity of Walworth. It will be remembered that Dr. Wm. A. Hammond—who at that time was certainly not accused of drawing the limits of insanity (medical or "legal") too narrowly—refused a large fee offered him by the counsel of that parricide, as he could not detect the slightest evidence of insanity. A member of the Utica school was then secured, and with such brilliant results that Walworth was not only acquitted, but, shortly after, cured of a form of insanity which was asserted to exist—if our memory does not deceive us—on the strength of some saliva found one morning on Walworth's pillow.

Arson by Lunatics and Fire Insurance Policies.—It has recently been decided (*American Law Register*, January, 1884) that, where there is nothing in the policy to the contrary, the insurer is not released from liability because property was burned by the assured while insane. It is difficult to see what legal value any proviso in the policy respecting the insanity of the assured could have on the validity of the assured's claim on the insurer.

Contracts by the Insane.—The Supreme Court of Idaho (*Central Law Journal*, February, 1884) has recently decided that an insane person cannot disaffirm a contract made by him unless he returns the consideration.

Expensive Hospitals for the Insane.—Dr. Pliny Earle (Report for 1883) says: "The epidemic fever of opinion in favor of 'good'—thereby meaning, as practically translated, 'expensive'—hospitals, which raged throughout the decennium from 1865 to 1875, or thereabouts, will be but too well remembered. It left, for Massachusetts, its own elephantine monument upon Hathorne Hill, in such fashion that it is not likely soon to be forgotten by the people of the commonwealth, and, at the same time similarly perpetuated its memory in other States. Of all the excessively costly curative institutions which were the products or outgrowths of that temporary craze, the Hudson River Hospital, at Poughkeepsie, New York, is the most remarkable for its costliness. Danvers is but a pigmy as compared with it. It was intended to be the institution of all institutions, destined, so long as it might exist, to stand as a practical and therefore irrefutable proof that lavish expenditure upon hospital buildings can cure in-

sanity." Now, to what was this popular fever due? It arose from two causes. The physician, as will be noticed on perusal of the work of Dr. Kirkbride on hospitals for the insane, had become dwarfed into the pure administrator. To build hospitals, not to observe cases, became the fashion for a medical superintendent. Of the teachings which such a fashion engendered the local politicians took advantage, and, to satisfy the thirst for the improvement of localities at the expense of the State, hospitals for the insane were erected at enormous cost. It is an open secret that the hospitals for the insane at Buffalo and Poughkeepsie, N. Y., were erected by Tweed as an attempt at bribery of local politicians who could not be bought directly with money. The Buffalo institution fortunately fell into the hands of those who resisted too excessive expenditures of money for frivolous purposes. By these excessive expenditures on hospitals for the insane, the cause of the proper hospital provision for the insane has been seriously injured in the minds of the people, and, as a result of the policy of turning the alienist into an architect, the insane are immured in filthy almshouses under the oversight of brutal politicians.

School-Training of the Insane.—Dr. J. Z. Gerhard, in a recent report of the Harrisburg (Pa.) State Lunatic Hospital, says that he believes that, in the management of hospitals for the insane, there can be adopted some of the methods that are in successful operation in asylums for weak-minded children. There is, it is true, an essential difference between the child nature and that of the adult in whom habits have been become fixed. So there is between the weak-minded child and the adult insane person; but, from his observations and the results he saw in some European hospitals, he is convinced that, in rebuilding, some of the arrangements of asylums for the care and training of idiots could be adopted with advantage. Schools have been in successful operation for many years in the Richmond Lunatic Asylum in Dublin (Ireland), to the great advantage of the patients, and have had a marked influence for good upon the management of the institution. Leuret outlined this principle, in his work on the moral treatment of the insane, and when Amariah Brigham was superintendent of the Utica, New York, Hospital for the Insane, such schools were in successful operation there; but, through the influence of the coarse materialism of the later Utica school, these schools were abandoned.

Recoveries from Insanity.—Dr. Pliny Earle, in 1876, formulated the following conclusions:

Conclusion 1.—The reported recoveries are increased to an important extent be repeated recoveries of the same persons. *Conclusion* 2.—The recoveries of *persons* are much less numerous than the recoveries of *patients* or *cases*. *Conclusion* 3.—From the number of reported recoveries of *cases*, or *patients*, it is generally impossible to ascertain the number of *persons* who recovered. *Conclusion* 6.—The (formerly) assumed curability of insanity has been practically disproved by more extensive experience. (Conclusions 4 and 5 are not susceptible of proof or disproof by statistics.) *Conclusion* 7.—The proportion of recoveries at the hospitals has been constantly diminishing during a period of twenty to fifty years. The following table, taken from the reports of the hospitals named, shows the validity of these conclusions:

HOSPITALS.	Readmission of Persons formerly discharged Recovered.	Number of times they had been discharg'd Recovered.	Excess of Recoveries over Persons.	Average Recoveries to each Person.
Worcester	65	160	95	2.46
Taunton.....	70	122	52	1.74
Northampton	43	66	23	1.53
At the three hospitals.	178	348	170	1.95

As might be expected, the views of Dr. Pliny Earle do not please the advocates of expensive asylums of the Utica school. Dr. J. P. Gray, in his recent report, says: "These views have been widely spread, and they are intended to show that insanity, instead of being a curable disease, is almost the opposite. He seems to draw his conclusions, not from what ought to have been done, but from what has been done. He takes the results growing out of the public policy of indifference and neglect, instead of basing his calculations upon what a wise and humane policy could effect. He seems to live in an atmosphere of chronicity, and sees his statistics from such a standpoint. No man can measure the evil with which such views are fraught. They ignore progress, and their tendency is to discourage and paralyze efforts, and to dishearten the public in the work of science and humanity. It is an evil day when science is directed to the past instead of the future." Admitting the general correctness of Dr. Earle's views, there are, however, certain elements of error in the comparison of these statistics with those of recoveries form other diseases. The insane man is in many instances on his

recovery immediately exposed to the influences which originally produced his psychosis. This is not the case with other affections. At the same time, too narrow views taken of a psychosis have resulted in an enormous number of recoveries by the same person. Epileptic lunatics, paranoiacs with episodiacal attacks of frenzy, and periodical lunatics are regarded as having recovered. If these were looked upon as chronic diseases, and the patient considered as having made but temporary improvements on recovering from the acute episodes of the disease, the disproportion between recoveries of persons and recoveries of cases, to which Dr. Earle calls attention, would enormously diminish. Here as elsewhere is demonstrated the necessity of a scientific classification to make statistics of any value, and the utter absence of anything like it, accounts for the Utica sneer.

Premeditation by Insane Homicides.—A homicide by an insane man, an inmate of the Utica Hospital for the Insane, presents some features of medico-legal interest. According to Dr. Brush (Report for 1882), D. R. P., the patient who made the fatal assault, was admitted to the asylum February 9th, 1882. There were no evidences on the part of P. previous to this attack that he had any feeling toward B., the patient killed, nor had he made any threats in regard to any persons in the asylum, his delusions referring mainly to persons in Syracuse. The attack was made in the morning while the patients were dressing and preparing for breakfast. B. at this time was up and on the ward, as was also P. The attendant in charge was aiding other patients, when he saw B. going toward the wash-room and P. with a leg of a table which he had wrenched off following, and immediately ran, but before he reached P., the latter had struck the fatal blow. B. sustained a fracture of the skull from which he died an hour afterward. When seized by attendants, P. said: "I have demanded the keys three times." Subsequently he told Dr. Hunt, the coroner, that he had not meditated striking B. until he saw him passing down the ward and then instantly decided to kill him, take the keys, and liberate the patients, "insane persons who are brought to the asylum to be killed." Then he at once wrenched off the table leg and gave the blow. He afterward said he had struck the wrong man; that he meant to kill a doctor or an attendant. There was clear evidence of premeditation in the case, and had the homicide been committed in a prison by a prisoner under just the same circumstances, no evidence of insanity

would have convinced an average jury that such a crime could be committed by a lunatic.

State Commissioners in Lunacy.—In 1878, the New York Neurological Society expressed the opinion that in every large State at least three Commissioners in Lunacy would be found necessary; one of these commissioners should be a medical practitioner, the second a lawyer, and the third a physician who has been at some time a medical officer in an hospital for the insane. In 1883, Dr. Godding (*American Psychological Journal*) says: "The insane in places of detention everywhere have a right to ask that there shall be in each State, above local trustees, overseers or superintendents, a power behind the throne, in the shape of a Board of Commissioners of Lunacy, who shall stand between them and wrong, political or other; a board which should never degenerate into a political organization. Created by executive appointment, it should be made above party, and solely in the interest of the insane. A well-recognized philanthropist, with qualities both of heart and brain, fitting him for the work; a lawyer and a physician, both eminent in their professions, and of a standing to be known and respected throughout their State. This triumvirate should have full powers of inspection everywhere, with advisory powers in all matters pertaining to lunacy, including regular reports, with their recommendations, to legislatures, on the subject of public and private provision for the insane, their condition and treatment. As a Court of Appeal in regard to discharge from custody in hospitals or almshouses, or transfer from one institution to another, their power should be absolute. To remove them as far as possible from political influences, they should receive the salaries of judges of the Supreme Court of the State, should be appointed for ten years, subject to impeachment and removal only for cause. Such a commission would mean something and, I believe, would be welcomed by hospitals and their superintendents, who would demand, as their right, only that those places should be filled by well-informed scientific men, of broad views, interested in no particular system, distingusthed by their philanthropy and non-partisanship, intent only upon serving the best interests of the insane and the State."

When it is remembered with what scandalous means the modest reforms of the New York Neurological Society were seemingly fought by the Association of Medical Superintendents, the opinion of Dr. Godding, last expressed, seems decidedly optimistic; it should, however, be remembered that Dr. Godding, like Drs.

J. Ray, Wallace, Gundry, and others, was opposed to such procedures, and that the opinion he expresses is probably that of the quiet majority of the association to which injustice would be done by accusing it of holding the views of a blatant unscrupulous minority. *

Provision for the Increase of Insanity in Michigan.—Dr. H. M. Hurd states that the increase of insanity in Michigan must be met, not by the erection of county asylums for the insane, nor by building a separate asylum for the chronic insane, but by the erection of supplementary buildings in connection with each one of our present asylums for special classes of patients, by the erection of a similar new asylum whenever the growth of the State demands it; by enlarging the scope of the asylum for insane criminals, so that all insane persons of the dangerous class may be carefully and securely kept there. The first means is the erection of supplementary buildings in connection with each one of the present asylums for the insane, for the care of selected patients, in good bodily health, who do not require that constant supervision and care which are required by certain classes of the insane. Such buildings need not be expensive. The great bulk of patients occupying them could be cared for in dormitories, and a large degree of personal liberty could be afforded. Such patients would secure what is needed for their comfort: constant, responsible supervision by persons thoroughly familiar with their necessities, and careful personal care from selected, well-trained attendants. Patients could be transferred from these detached buildings to the main asylum whenever their condition required a different degree of care and a more constant supervision. These supplementary buildings should accommodate patients of two classes. First, cases of chronic disease who have become thoroughly asylumized and look upon the asylum as their home; patients who are interested in the daily employments of others, and who are able to enjoy a certain amount of liberty. These buildings should be erected in blocks without airing courts or strong rooms or expensive architectural arrangements. There should be one or two large central dining-rooms to accommodate patients of each sex. Much of the labor of preparing food and care for the wards could be done by patients under the supervision of trained attendants. Work-shops could be erected in close connection with the buildings designed for this class of patients. Their labor is much more valuable than the labor of any other class of the insane, and they can be trusted with simple tools with greater safety. The second

class to be accommodated in detached buildings is convalescent patients. There should be erected, in connection with each institution, two cottage buildings to be used as convalescent wards. They should be entirely detached from the regular building, and patients should be sent there who are in a condition to appreciate and receive benefit from increased liberty. They should constitute half-way houses on the journey toward home and should be designed to prepare patients for restoration to the home circle. Buildings of the character mentioned can be operated in connection with the present asylum buildings at less proportionate cost than institutions for the chronic insane simply, and their working would be vastly more satisfactory. Thirty per cent of the inmates of asylums could be thus provided for. All classes of the chronic insane could not be cared for in this manner, and no attempt should be made to take them from the central asylum building. The removal of this number of patients would leave the wards designed for the treatment of curable cases free to be used for that purpose. The experiment has been tried satisfactorily at Middletown (Connecticut), at London and Kingston (Ont.), at the Government Asylum at Washington, and at Kankakee (Ill.). The most satisfactory arrangement exists at Washington, where a building designed for two hundred and forty patients has been in operation for several years. The only objection that can be made is to the proposed treatment of the "dangerous class of the insane" in a criminal hospital for the insane; the term "dangerous" is decidedly ambiguous. A hypomelancholiac must be considered a "dangerous" lunatic, yet Dr. Hurd would not place such a patient in a criminal hospital for the insane. He probably means the suspicional delusional lunatics who, it would at first sight seem, should never be trusted fully; yet such lunatics, as has been shown by Clouston, can be made very useful members of the hospital working-staff. *

Heredity in Insanity.—Before the Association of Medical Superintendents of Hospitals for the Insane, Dr. John P. Gray, of Utica, gave utterance to the following views: "No son ever became insane simply because his father or mother, or both, or his grandparents were insane. No person ever became insane simply because of any impression arising from parentage upon either his physical or mental constitution. Every person who becomes insane, whether he has had insane parentage or not, becomes so by reason of some physical causes operating to change the physiological state of the brain. Whatever his parentage may have been, in-

sanity in him can only be developed by the same causes which produce it in persons who have no insane parentage. Parentage cannot impress upon offspring even a tendency or a 'predisposition to insanity.' The most it can do is to transmit a physical structure or organization, which will be *more liable* to the operation of ordinary causes that produce disease in any form in people generally, insanity included. Those who have insane persons among their ancestors, in a direct line, can only become insane, therefore, as other people do, by the operation of the same causes. There is no law in their members tending or dooming or predestinating them to insanity. If they are as strong in system as people who have no insane among their parentage, as they generally are, they have only to take the precautions and care that people generally need; and if they are not as strong, they must take more care against the exposures of life as all delicate people ought to. This is all there is of this question, the sum and substance of the matter. The hopes and destinies of modern civilization itself are, in a measure, wrapped up in the noble potentialities which a beneficent Creator has embodied in the constitution of human nature, which it is the probation of mankind to develop through successive generations. What I wish to combat is the notion of the *direct transmissibility of disease as such*. The monstrous figment of scientific pessimism that the abnormalities and lesions of the human organism can acquire any such persistent and stable character as its own *uni pilis*[1] itself; that nature puts a destructive force on an even race with the construction in any of her operations; an idea which ought to be contrary to any philosophic system of evolution itself. It is a law of all organisms to right whatever is foreign to its own normal condition. If all that is claimed for 'morbid heredity' be true, it would be a cumulative process which must eventually swamp the vital energies of the world. It is philosophically absurd to suppose that a force opposed to organic life can so seat itself in the constitution of an organism as to perpetuate itself by that organism's generating power." In this, Dr. Gray is at least consistent with the views advanced by him at the Guiteau trial. But why does he still keep in his reports the table headed "hereditary transmission of the disease"?

Unsuitable Pay Patients in Convalescent Wards.—An evil due to a disregard of the objects of a hospital for the insane is the placing of a certain class of unsuitable patients in con-

[1] So in original.

valescent wards, sometimes for pecuniary reasons purely, sometimes because the patient is a relative of some little great politician whom the authorities desire to placate. Dr. Godding very fittingly says in this connection that "the care of the State should be for those who have no means to care for themselves; or if her provision for the insane is so ample that all can share it, then mental condition, not wealth, should decide the classification. No ten or twenty dollars a week should confer the right to send the drivelling, imbecile scions of shoddy, or vulgar, gold-bedizened women in mania, to trample like swine through all the pleasant places of the quiet wards, simply because, being wealthy, they must be endured in rooms and society from which the conditions of their insanity would otherwise exclude them. The returning reason of honest indigence has rights that are sacred, and not to be thus ruthlessly invaded. Why, one repulsive face of that type of mental decay, drooling at the breakfast table, will spoil the appetite and blight the morning of a whole convalescent ward. 'These wards are for your pay patients?' is the oft-repeated question of visitors; it is a pleasure to be able to answer they are for those whose mental condition accords with the surroundings, without regard to their pecuniary circumstances."

Social Dangers from Furloughs of the "Harmless" and Convalescent Insane.—There is so much stress laid on the necessity of and benefit from furloughs of the harmless insane that the converse of the picture deserves study by the dilettante alienists who would indiscriminately furlough the insane. A recent case illustrating one of the dangers arising from careless furloughing of the insane occurred in Indiana. Some time ago, W. T. C., a young man, of Huntington, became a hebephreniac and was sent to the Indianapolis Hospital for the Insane. Improving here very rapidly, he was returned home to test the completeness and genuineness of the apparent restoration to health. His condition soon became such as to alarm his friends, but he left home and was married to a young lady whom he had met while in college. His friends, suspecting his intention, telegraphed the young lady not to marry him, but to no purpose. The young man made his way home again without his bride, and has been returned to the hospital for the insane. Thus the insane population of the country is increased by carelessness in the selection of cases for furlough. In the New York City Asylum for the Insane, furloughing was abandoned, because friends, hebephreniacs, and wives of old chronic cases exerted political influence to secure the same

privileges as the convalescent insane. An Irish case very similar in its general nature has recently been made the subject of litigation. The man, who seems to be a case of paranoia, a forty-five-year-old Irishman, member of an excellent family in which there was strong hereditary taint, was accused of marrying five women, all of whom were then alive, and none of them divorced. They all belonged to good families, and three of them possessed considerable fortunes in their own right. They were all present at the trial and manifested considerable regard for the prisoner and great hatred for each other. The prisoner greeted each of them with smiles, which were returned. The marriage of the prisoner with each of the women was acknowledged by the prisoner's counsel, who pleaded not guilty to the indictment and stated that the defence was simply insanity. His client had been regarded as an imbecile lunatic since boyhood. His lunacy had been of a *harmless* character, and he had been permitted to travel considerably without a companion. He had, however, been at different times under treatment in four Irish and continental hospitals for the insane. When out of an asylum, he travelled about and made acquaintances and was able to make love successfully. It was only recently known to his relatives that he was married to even one woman. The family physician testified that the accused had been regarded since childhood as of unsound mind. Men who were not physicians recognized the fact. The doctor had treated the accused for many years and had recommended placing him in private hospitals for the insane. The prosecution accepted the plea, and the judge directed the jury to find the prisoner insane. It was ordered that he be confined in a hospital for the insane during the will of the lord-lieutenant. During the examination, the wives showed great interest in the prisoner, and each desired to take an affectionate farewell of him, as he was led away. Each claimed him as her "husband," and two of them had a very lively set-to outside of the court-room. Five women, presumably of fair intelligence, had married a person whom men not physicians recognized as an imbecile lunatic. None of them had discovered, in the time they had lived with him, that he was of unsound mind. That they loved him is shown by their hatred of their rivals. Each wife hated the other wives for no other cause than that they loved her husband. An educated Irishman is generally a very agreeable person, which may account for the ability of this one to win and hold so many hearts. Sergeant O'Brien, who represented the Government at the trial, explained the matter by tating to the court that, "when men are afflicted, women are

always ministering angels." The women all smiled at the statement, but their smiles turned to frowns as they looked in each other's faces. The value of lay evidence as to the non-existence of insanity is clearly shown by the wives' non-recognition of the prisoner's mental condition. Clouston reports the case of an insane patient in whose family neuroses and psychoses were rife who went through a form of mania. *

The Speech Tract in the Brain.—While the cortical centres whose lesion produces aphasia have long been determined, it has but recently been ascertained in what part of the brain the tract lies which joins these centres with the nuclei of the cranial nerves in the pons and medulla. Wernicke was the first to distinguish a variety of aphasia neither purely sensory (amnesic aphasia, word deafness), nor purely motor (ataxic aphasia). He describes this variety as aphasia of inco-ordination (Leitungsaphasie) and ascribes it to a lesion interfering with the passage of impulses along the association fibres which join the first temporal convolution (the seat of the memory of words) with the third frontal convolution (the seat of the memory of motor combinanation necessary to speech). This form is recognized by Kussmaul under the title paraphasia. It is well known that loss of speech may be produced by a lesion destroying the nuclei upon the floor of the fourth ventricle which govern the muscles involved in articulation. This affection has been named anarthria, to distinguish it from aphasia, although in some cases the two symptoms cannot be differentiated, excepting by the aid of accompanying symptoms characteristic of each. It is evident, therefore, that integrity both of the motor centres in the cortex and also of the motor nuclei in the pons and medulla are necessary in order to pronounce any word. That these centres and nuclei must be connected by a motor speech tract is also evident. For some time, it has been supposed that this tract formed a part of the great motor tract, and passed from the third frontal convolution over the anterior superior surface of the lenticular nucleus, and, entering the internal capsule, went down through its middle third and thus entered the crus. It is known that such is the course of the motor tract between the cortical centres for the face and tongue and their nuclei in the pons, and it was thought that this tract also conveyed impulses between the speech centres and the same nuclei. Since the publication of his work upon brain diseases, Wernicke has met with a number of cases in which a lesion of the internal capsule affecting this motor tract and pro-

ducing right facial and hypoglossal paralysis failed to produce aphasia. He has also found that lesions in the posterior part of the posterior third of the internal capsule producing hemi-anæsthesia without hemiplegia of the right side have also caused aphasia. It is well known that lesions of the island of Reil may produce aphasia, even when the facial and hypoglossal muscles are not paralyzed. Putting these facts together, Wernicke reaches the conclusion (*Fortschritt der Medicin*, 1884, June 15th) that the motor tract for speech lies in a different part of the brain from the motor tract to the facial and hypoglossal nuclei. This tract he has traced by a series of cases in which the lesion lay in its various parts. He describes its course as follows: Leaving the third frontal convolution, it ascends in the white substance to the upper level of the lenticular nucleus, then turns directly backward, crossing at right angles the motor tract from the lower third of the anterior central convolution, passes along the outer border of the lenticular nucleus in the external capsule lying just beneath the upper part of the island of Reil, till it reaches the posterior angle of the nucleus over which it curves and thus enters the posterior third of the internal capsule between the sensory tract from the surface of the body, and the visual tract to the occipital lobe. Descending in this part of the internal capsule, it reaches the crus, where it lies in the median portion of the crusta, thence entering the central and median portion of the upper pons. In the pons, the fibres separate, some passing directly to the seventh n. nucleus, others going down in the median part of the pons approaching its dorsal surface as they descend, and terminating in the various nuclei from the tenth to the twelfth, at their appropriate levels.

This course explains the occurrence of aphasia with lesions of the cortex involving the island of Reil or the convolutions adjacent to it and lying posterior to the third frontal convolution; cases of aphasia associated with hemianæsthesia or hemianopsia, or with lesions of the crus and pons; and it also explains the absence of aphasia in lesions of the right internal capsule which produce hemiplegia. M. A. S.

Meynert's Commissure.—This beautiful commissure of the Diacœlian gray we recently succeeded in exhibiting in its entire length, in a fortunate section of the human isthmus. The section shows the parallelism of the commissure with the optic tracts which are cut so that the chiasm and tracts are exposed in their

continuity. FOREL,[1] who more accurately describes it than the discoverer after whom it is named, traces it to the *substantia innominata* after its insinuation between the "Linsenkernschlinge" and optic tract. The superficial appearance of one section is as if both lenticular nuclei were drawn out at their inner apices into this commissure. It seems to form a part of those fibres which the "Linsenkernschlinge" detaches under the lenticular nucleus into its articuli. Nothing is known of its signification; it seems to be a true commissure, as far as the eye can tell. E. C. S.

The Cook County Asylum.—We are gratified to be able to announce to our reader that the trustees of the Cook County Asylum at Chicago have appointed as medical superintendent of that institution the well-known alienist DR. JAMES G. KIERNAN. The particularly pleasing feature of this appointment is the fact that it was secured by strictly medical influences, and that Dr. Kiernan could be induced to accept the position offered him only on pledges of reform, such as would enable him to combat successfully the evils which have rendered the management of that asylum so difficult to his predecessors. Dr. Kiernan is fitted for his new position as few who obtain asylum appointments in the United States are. His name was perhaps more familiar to French and German than to American and English alienists up to within a few years ago, when he led the expert testimony for the defence in the Guiteau trial. As a fertile contributor to American psychological literature, a fearless exponent of the truth on the witness-stand, when weaker men quailed before the acceptance of an unpopular position, his name is familiar to the readers of this JOURNAL, and they will doubtless unite with us in hailing the appointment as an augury of a change for the better in the *status* of asylum management.

We understand from a contributor of the JOURNAL who recently visited the Cook County Asylum that the institution was in a frightful condition, that ulcerated surfaces of certain patients in a remote ward were—*horribile dictu*—fly-blown, swarming with maggots, that there was just half an ounce of quinine in the pharmacy; while the revolver was flourished with nearly the same liberality as at Auburn some years ago. From all this we infer that the task of Dr. Kiernan will be kin to the one of cleaning out the Augæan stables. Certainly a commonwealth like Chicago has reason to blush for such a state of things, and the more hearty its aid to one who is, if any one, a personal embodiment of

[1] Untersuchungen über die Haubenregion, Archiv f. Psych., vii., p. 481.

the asylum-reform movement, the sooner will it remove this stain upon its record.

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Relation of the Pyramidal to the Interolivary Tracts.—In the paper on the Stratum Intermedium Degeneration published in the August and November numbers of last year's JOURNAL OF NEUROLOGY AND PSYCHIATRY, attention was called to the existence of degenerated fasciculi encroaching on the pyramid field. It was left undecided whether this indicated an admixture with pyramidal fibres, or a retrograding pressure sclerosis of those fasciculi which leave the pyramid tract to place the hypoglossal nerves under cortical control. We are now in a position to decide the question. In a specimen of double descending degeneration of the pyramidal tracts, given us by Dr. Wm. C. Welch, and obtained from the patient described by Dr. S. P. McNutt, at the last meeting of the American Neurological Association, we found the same fasciculi which were degenerated in our case WITHIN the pyramid field, the ONLY NORMAL fibres in the degenerated pyramids of the latter case. This proves that these fibres properly belong to the interolivary stratum—in other words, that there is an admixture of both tracts, mediating a transition to the case of the elephant where (probably) the pyramid fibres run within the lemniscus field in its inner portion.

In man, there is a distinctly marked division of the true pyramid tract, visible in sections of the upper third of the oblongata. It is situated on the interpyramidal fissure, and inserted (in section) like a wedge between the interolivary tract and the rounded main part of the pyramid. It is not affected in secondary degeneration of the interolivary tract. Owing to its disappearance, at the upper hypoglossal levels, we are inclined to suspect that it contains part of the controlling fibres for the motor-nerve nuclei of the oblongata. It is a very distinct tract in many medullas, and refracts light a little differently from either the pyramids or the interolivary layer. E. C. S.

A Remarkable Symmetrical Cerebral Lesion.[1]—The above-mentioned brain presented, upon its left side, a deep ventrical sulcus, occupying the position of the ascending central convolution and at its base embracing also the adjacent portions of the inferior parietal lobule and of the third frontal convolution. At the bottom of this fissure the pia only separated the cavity of

[1] Difetto parencefalico in individuo emiplegico doll infanza e con arresto di sviluppo degli arti dei lati emiplegico pel Prof. L. Bianchi.

the ventricle from that of the arachnoid sac. Within the ventricle, the tail of the caudate nucleus appeared narrow. The internal capsule was narrow, especially in its posterior half. There was complete absence of the corresponding pyramidal tract. There were no secondary degenerations, and the cortical gray matter of the fissure with that of the caudate nucleus was embryonal in type. A similar fissure, occupying only the upper third of the central convolution, was present on the other side. The patient was a man of seventy-three years. He is said to have been a right hemiplegic, dating from convulsions in infancy. The left leg also was paretic. Contractions were present, with atrophy of the right arm, which was in every respect smaller than the arm of the other side. The degenerative reaction was not present. The face was not affected, and there was no aphasia. There was a diminution of tactile sensibility upon the right side. The sensibility to pain and to heat was normal; the muscular sense was not tested. The intelligence was good.

The defect is considered to have been congenital, and the implication of the caudate is supposed to indicate that this nucleus is directly connected with the cortex, in opposition to Wernicke's theory. S. E. P.

The December Number.—The next number, which closes the third volume of this JOURNAL, will include the oft-postponed Reviews on Allen's, Clouston's, Buckham's, Harrison's, Strumpell's, Meynert's, and Lawson's works. Our editorial table is groaning under the weight of the accumulating neurological literature of the day. Several of these works may be conveniently reviewed under a common head, so that our readers will not lose by the delay, but find cognate contributions compared and contrasted from a much broader point of view than would be possible in disjointed abstracts or notices. The concluding Proceedings of the Society of Medical Jurisprudence, which is about to close the second year of its successful career, will also be published in this number. The interesting and aggressive discussion on Dr. L. C. Gray's paper on the Fillmore Will Case, and the papers promised by Drs. Brill, Hardy, and Judge Hull, on "Hanging as a Death Penalty," "The Rhineländer Case," and "Expert Testimony" respectively, will thus be early placed before our readers. Fortunate as we have been during the present year in securing valuable original matter, we are already in a position to promise much more for the fourth volume. Our regular staff of contributors have been more than usually fortunate in their pathological and clinical

findings. We may safely claim that the record of the AMERICAN JOURNAL OF NEUROLOGY AND PSYCHIATRY for 1885 will place it near, if not abreast of, the best continental periodicals.

Meynert's New Book.—Anything from the pen of the founder of modern applied cerebral anatomy will be hailed with enthusiasm by his numerous pupils and students in this country. They will, however, on perusal of his work, confess to some disappointment. It is not up to the times in a great many respects; its author has failed to assimilate the teachings of many of those who, picking up the Ariadne-thread where he left it, unknotted the tangles which he had made at some points, and carried it further into the cerebral labyrinth. Nor is his *répertoire* of cases of focal diseases at all co-extensive with ultra-modern demands. We regard the colored diagram of the spinal cord as an unfortunate attempt to harmonize his views of fifteen years ago with those that prevail now. It was alleged of his renowned treatise in Stricker's collection that it is difficult reading; the present work is fully as involved, and far less intelligible than the more masterly treatise of his younger days. In view of the practical demand in English-speaking countries for clear and simple accounts of anatomical and physiological treatises, we cannot but regard the attempt of a New York publishing house to translate it into English as one predestined to meet with but indifferent success.

As to the philosophical portion of the book, it is unexceptionable, and will appear more like the best work of its author—to those who are able to appreciate him—than anything else. The illustrations, as a rule, are of the best kind, and many of his older figures have been advantageously supplanted by accurate diagrams resembling somewhat those in Wernicke's work. As an anatomical guide, the latter is, however, still superior to the book of Meynert, though the latter has the advantage of a later appearance. E. C. S.

Neurological Piracy.—In a series of articles published with lightning-like rapidity in the *Medical Record* and *Medical Journal* of this city, by the translator of an atlas, the electrotyped plates of which had been used without alteration from an edition so old that it was supposed to have been forgotten, numerous passages have been pilfered from cotemporary authors without a change of language. In the near future, we intend to detail the various instances of this contemptible practice, as a wholesome lesson to the publishers of this trash, if not to the perpetrator, who, like most such subjects, is probably as impervious to sarcasm as he must be devoid of shame. E. C. S.

SOCIETY PROCEEDINGS.

PROCEEDINGS OF THE SOCIETY OF MEDICAL JURISPRUDENCE AND STATE MEDICINE FOR THE YEAR 1885.

Seventeenth Regular Meeting.

The seventeenth regular meeting of this Society was held at the customary time and place, on Thursday evening, September 11th, 1884. In the absence of the President and Vice-president, the meeting was called to order by the Secretary, who announced the floor open to nominations for the position of temporary chairman. Dr. C. S. Wood having received the nomination, was unanimously elected to that position.

The trustees reported that their next meeting would take place at the residence of Dr. E. C. Spitzka, on September 29th, 1884. Mr. Max F. Eller, the delegate to the annual meeting of the Massachusetts Medico-Legal Society, then reported that, of the delegates appointed to attend that meeting, he alone was able to go. He was there cordially received, but was mistaken to be the representative of the New York Medico-Legal Society. He took great pleasure to disabuse them of that belief. He read a paper before the Massachusetts Society on "Some Medico-Legal Features of Life Insurance." That Society also expressed its good-will to us, and extended to Mr. Eller every courtesy.

The discussion of Dr. Gray's paper being next in order, the Secretary read for Dr. Gray the conclusions which that paper was intended to present; the discussion was then participated in by Judge Hull, Dr. Corning, Dr. Spitzka, Mr. Benn, Mr. Livingston, and Dr. Hardy; it was then closed by Dr. Gray.

JUDGE HULL: Mr. President and gentlemen of the Society: My sense of duty requires me to criticise somewhat sharply the interesting paper under discussion.

In so doing, I disclaim all intention of being personal or offen-

sive, for I entertain for the learned author of the paper a profound respect.

He has presented his case from a purely medical standpoint.

That will not do in a society for the promotion of medical jurisprudence.

I know that it is sometimes flippantly, and I think unwisely said, that doctors who attempt to talk about legal evidence make fools of themselves, and that lawyers who, in their discussions, enter upon the domain of mental alienation, or surgery, or toxicology, or any of the branches of medical science which belong to the realm of medical jurisprudence, make themselves equally ridiculous.

I do not share in any such doctrine. If that be so, then we had better burn all our works on medical jurisprudence and abolish all societies relating to that subject.

Oh, no! all doctors who have distinguished themselves in the science which we are here to promote, have made themselves familiar with that class of legal principles which are interwoven with this science.

And all lawyers who aspire to learning and dignity in their profession, have eagerly sought to acquire such general knowledge of medical science as would enable them to be useful and successful in that great and interesting class of cases in which that science becomes involved.

The illustrious Dr. T. Romeyn Beck says: "Medical jurisprudence, legal medicine, or forensic medicine, as it is variously termed, is that science which applies the principles and practice of the different branches of medicine to the elucidation of doubtful questions in courts of justice."

The doctor's paper relates to a will case where not only the question of mental alienation or unsoundness of mind is concerned, but the further question whether such unsoundness of mind was of such a character as to deprive Mrs. Fillmore of the power to make a valid will.

Now, to determine the last branch of that question, certain legal principles must be understood, certain rules of the law of evidence must be established, and the expert who would elucidate the question under contention, so as to guide or assist a court of justice, must be familiar with those principles.

It is well settled in law that a person may have certain forms of lunacy and yet be able to make a valid will.

Now, in order to determine the extent of the mental impairment of the decedent, a multitude of facts have a bearing on the

question, which have been entirely omitted in the paper of the learned doctor.

1. None of the provisions of the will have been given.

2. No data from the paper to determine whether the will was a reasonable, sensible document.

3. Nothing to show in what respect the will differed from the codicil, or whether the codicil was a reasonable or sensible departure from the will by reason of a change in the condition of the estate, nothing in the paper to show who had claims upon the decedent's bounty, or who had been cut off, if any.

It appears from the paper that the decedent had an attack of hemiplegia about one year and nine months after she made her will, and that she had a second attack about thirteen months after she made the codicil. The logic of the learned author of the paper would seem to be that proof of an attack of hemiplegia one year after a will was made furnished evidence that the blood-vessels of the brain must of necessity have been so impaired at the time of the execution of the instrument as to indicate that the brain was diseased, the mind unsound, and the testamentary capacity of the decedent gone at the time.

I cannot subscribe to any such doctrine.

There are numerous instances where persons, even after an attack of hemiplegia, have been adjudged to have made valid wills.

The doctor was unfortunate in his illustrations.

He cited the case of Judge Perry, and also the surrogate who tried this case, who suddenly died from paralysis occasioned by weak, overtaxed, or diseased blood-vessels of the brain.

Would he have us believe, if either of those gentlemen had made a will one week even before he was stricken by paralysis, that such a will would for that reason have been invalid?

The learned author of the paper has cited the language of the nurses and servants who gave testimony for the contestants, but he has not given the cross-examination of those witnesses nor the facts that might well tend to show bias, prejudice, or untruthfulness. It seems that the surrogate had all those facts before him and sustained the will and the codicil.

Now, the picture which the doctor has drawn from the testimony of the servants and nurses, all grouped together without the dissection of cross-examination, may perhaps justify the conclusion to which he arrived, namely, that the case was one of chronic mania.

But I can well conceive that all of those odd, irrational, eccen-

tric, perverse, absurd, and petulant acts, when explained one by one, with their attendant circumstances, might, instead of showing chronic mania, indicate, in an aged lady, *acute peevishness.*

The use of the words "darn," "damn," "devilish ladies," "cussed ladies," was indication of bad taste, but not proof of chronic mania. The quotation from the testimony referring to the ladies that "came there and talked her to death," in which she said: "Cuss them, she wished she had some infernal screw-driver to screw up their everlasting tongues," while in very bad taste and entirely inexcusable in any one, and more particularly in a lady who was the widow of one who had been President of the United States, yet taking into account her advanced years, recalling, no doubt, all the fulsome and heartless flattery that had filled her ears during her residence in Washington, reflecting perhaps upon the hollownesss and utterly unsubstantial character of all political honors, remembering the numerous instances in which she had seen so-called ladies "crook the pregnant hinges of the knee that thrift might follow fawning," no wonder that she should soliloquize in the petulant manner she did.

DR. SPITZKA: On the assumption of facts presented by Dr. Gray, there can be no doubt whatever that Mrs. Fillmore was suffering from a comparatively common form of mental deterioration. Perhaps it would be safe to class such disease, with kindred forms of mental disorder, under the common designation of "Chronic Mania," as Dr. Gray does, were it not that it constitutes a sort of connecting-link between senile dementia and the ordinary psychoses of middle life. This form of insanity I have latterly, in conformity with VOISIN, termed "atheromatous insanity." I believe that it, or the allied pathological states of senile dementia, cerebral hemorrhage and softening (ordinarily recognized as paralytic strokes), is made the basis of more will-contests than all other forms of insanity combined. Hence, from a medico-legal point of view, the physician should be prepared to duly examine and give proper weight to the mental manifestations of all patients exhibiting paralytic and epileptiform phenomena, as well as defects of speech—mechanical or truly aphasic.

While Dr. L. C. Gray furnishes us with a consistent and logical account of the strong points sustaining Mrs. Fillmore's insanity, and the picture appears to be a complete one in all respects; while, too, it is impossible to criticise the scientific presentation of the matter, there is one element to which I think it proper to call attention, and that is the unreserved admission of every ap-

parently favorable fact in the evidence without regard to mitigating circumstances, or to the inconsistencies or shortcomings of such testimony. In accepting all this, he has but followed the example of our legal brethren, who are capable of evolving strong hypothetical questions out of very weak material. This grouping together of facts may be carried too far, and I believe there is scarcely a will contest in the course of which testimony is not given which, separately, amounts to nothing, but, when associated with other testimony, presents an imposing spectacle of mental disease. Of course, the physician can judge only from the collective group of symptoms, because single features, such as forgetfulness, unreasonableness, high temper, moral obliquity, nay, even positively vicious mental combinations, do not in themselves demonstrate the existence of mental disease; on the other hand, there is this lurking danger in the hypothetical question that it may establish bonds of connection between remote and unrelated data, and to that extent exhibit a spurious picture.

The case of Mrs. Fillmore seems to have been strong enough not to require being strengthened by such a process; indeed, I think the employment of remote, unrelated, and insignificant facts will have materially weakened both the reasoning of Dr. Gray and the closing argument of the counsel for the contestants in the eyes of many of the legal part of the audience who had the privilege of listening to his paper. I may be permitted to refer to these in some detail.

In proving the existence of atheroma of the cerebral arteries, a valuable material substratum for the mental history was furnished, but to lay very great stress upon it, must have struck all of you as unwise, in view of the fact that the very surrogate who tried the case had this disordered condition of the brain-vessels in a marked degree himself. It is true that in deciding adversely to the view that Dr. Gray sustained, he may have manifested the mental impairment which often results from the arterial disease of old age, but I have seen just as absurd opinions given by surrogates who had not reached the age of fifty, and who had not manifested any signs of cerebral atheromatosis within a very few months, and I think my friend, Judge Hull, will remember as marked an instance himself. There is here very little consolation to be derived from the fact that the surrogate suffered from the same disease Mrs. Fillmore exhibited.

I have often been surprised, in making post-mortems on persons dying rapidly from apoplectic attacks, who up to that time had enjoyed fair mental health, to find so gross a condition of arterial

change as would lead one to conclude that if mental impairment ensued invariably from such change, it ought to have been most marked in that very case. I show you the entire system of the larger and some of the medium cerebral arteries of just such a case. You will see that calcification in rings has proceeded about as far as it ever can proceed ; yet this man was not insane. I think some additional factor, be it in the line of predisposition or of essential change of the nerve elements, or a functional indisposition of the centres which control the brain circulation, is a necessary adjunct to the ordinary changes of old age to produce insanity.

I do not believe, as Dr. Gray seems to imply, that there are "purely mind-serving regions" in the cortex whose separate disease will produce mental disturbance, for many centres co-act in the simplest mental processes, and disease must be extensive and symmetrical to render such processes impossible or defective. There is a single region, disease of which produces essential psychical impairment with any constancy, and that is the occipital lobe, whose lesions always produce obtuseness of perception, as, far as I know. Then if the speech faculty be considered an essential factor of the human mind, disease of the various symbolic centres produce definite psychical effects. I am, however, prepared to establish the proposition before this Society at no very remote day that aphasia or loss of speech in any of its forms does not imply mental incompetency, as some have claimed.[1]

I think that with cerebral atheromatosis purely mental symptoms are very rare, if ever present without physical affection.

Among the trivial details related, and which reaches the presentation of the case, was the exclamation, "Hell is let loose, and the hounds are after me!" shortly after some revivalists had visited her. There being no evidence to show what Mrs. Fillmore's religious belief had previously been, this is nothing more than an expression common among revivalists, and not one-tenth as absurd as the daily table-talk of Cromwell's troopers, who were, as every one of us will admit, a very sober, brave, and useful body of men, not to England alone, but to the mundane cause of civil

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[1] In a case of word-and-song deafness observed with Dr. Cypert, which was complete (absolute) for two days, disappearing under enormous doses of iodide, there was complete recollection of the period of illness on recovery, while during the illness the patient answered in words to questions in writing with her full normal intelligence better than on a previous occasion, when her luetic disorder had resulted in ptosis and other paralytic phenomena.

and religious liberty, whose principles many of them transplanted to this side of the Atlantic.

I most seriously object to the interpretation of Mrs. Fillmore's language by her illiterate servants. To interpret the words of a given person one must one's self have at least that command of language which the former has. It is not supposable that Biddy, if she heard Mrs. Filmore say damn, or damnation, curse or cursed, should use those words, but rather the to them familiar forms of "darned" and "cussed." And where Mrs Fillmore, in speaking of certain ladies as coming there and talking her to death, and of desiring to have a screw-driver to "screw up their infernal tongues," she is clearly an object of sympathy. All who have been pestered by book-agents or those insinuating youths who carry round samples of gelatine coated pills, patent plasters, will understand Mrs. Fillmore's feelings on this head.

I ask whether the regard and affection for "Her Blessed John," the coachman, was any more extravagantly expressed, or half as disgustingly published, as Queen, I beg her pardon, Empress Victoria's infatuation for John Brown. I am of course not prepared to deny that in both cases the sexual perversion oft-times occurring at the climacteric may be at fault.

I sincerely trust that when Dr. Gray referred to two medical witnesses by name as testifying with him in the matter, he did not do so in any other than narrative form. I should consider the advocacy of any cause by these men rather the weakness than the strength of a given cause. Do not misunderstand me here, and believe for a moment that I am unaware of that professional etiquette which forbids most criticisms of the nature I am about to make. I hold that when professional etiquette is made to cover fraud and deception, that it ceases to be binding on those who are willing and able to prove that the most unpardonable and systematic kind of perjury has been going on on the witness-stand, under the shield of the medical diploma, by an organized band of professional witnesses. Its disgraceful culmination in the Rhinelander case, where these persons deliberately swore a person's liberty away on the strength of a glance thrown across the court-room, and swore him insane under five different heads of insanity at once, is a timely commentary on the text I am about to submit.

One of this class of witnesses testified in the Cole-Hiscox murder trial. It was well known that the shooting was so justifiable that the jury only wanted an excuse to pronounce Cole "not guilty." The physician in question accommodated them with the insanity theory. A long list of questions was prepared by counsel

for the defense and read to the doctor, whose answer in every case was an affirmative one. Cole was pronounced not guilty. A year after, the district attorney who represented the cause of the prosecution undertook the defence of a woman in another city. He asked the doctor, who, in the second trial, had been employed by the State, *the same set of questions to which his answer the year before had been Yes*, and it was now in every case *No!* The woman was convicted.

The Walworth case must be still fresh in your minds. In the Grappotte case, one of the bevy of experts, though a man of the easiest conscience, did not dare to testify against Grappotte's insanity, but advised the District-Attorney not to have an examination of the prisoner, but to put a very adroit witness on the stand to testify hypothetically. Will it be believed that the unanimous testimony of the physicians who treated the accused for insanity during the two years preceding his crime, and during his sojourn in jail, was overbalanced by this dishonest trick, and the man convicted? And will it be further believed that this happened with gross evidences of brain disease?

In my reference to the Rhinelander case, do not suppose that I am at all attempting to pass on a case which I have not examined the subject of, but merely on testimony which was at every step inherently absurd, and in places demonstrably mendacious. I suspect, therefore, the integrity of a cause which made it a reproach to a witness who testified to Rhinelander's sanity that he had sworn Guiteau to be sane, while two of the chief instruments of the family in that trial testified to exactly the same effect, with a little additional virulence.

I think Dr. Gray's paper did not require that citation of corroborative opinion to lend it strength. The testimony of the nurse, the incident at the Gettysburg Hotel, the demeanor of decedent on the occasion of the "Sizer Will," are such strong and consistent evidences of insanity, and so justify his conclusions that I should be prepared to indorse the latter in every detail, and if I had any misgivings, would attribute them to his unfortunate association with men who only by merit of accident happened to be on the truthful side.

While agreeing with Dr. Gray's conclusions, I would yet say something about one feature of the testimony, which should be accurately weighed. Much of the testimony against Mrs. Fillmore's sanity is by a disappointed legatee, and it so happens that it is also the most extravagant, and, in some respects, unlikely testimony given. I think that it is to this the family attendant of

Mrs. Fillmore referred when he said that "If he could believe the fact in the hypothetical, he would believe the decedent to have been insane." He evidently thought the testimony strained. It looks very much as if the coachman had tinctured his testimony as to insanity with his own crude notions of the disease, perhaps as unconsciously as unintelligently. There is a great deal of this kind of testimony in surrogates' courts, and it is a grave source of danger to the mayhap—as in this case—just cause in behalf of which it is given. I should rely on the testimony of the nurses, of the physician at the sanitarium, of the lawyers and ladies of standing and discrimination more, and on the chambermaids, cooks and coachmen less, in forming an estimate that Mrs. Fillmore was not only medically insane, but positively *non compos mentis*, even as the law now stands, when she made her will, and for a year or more before. It has always been a startling fact to me, and one that I have found it often difficult to explain, that such overwhelming proof of insanity is given in such cases by the laity, and the family attendant is unable to recall any evidence in the same direction. It proves either that physicians are not, as a rule, trained to the observation of the mental *status* of their patients, or that the lay evidence is exaggerated or made up for the occasion. The former is, I think, more frequently the right explanation; the knowledge of insanity is low, or so many pretenders could not have so long been able to point to professional support as their mainstay. And in the Fillmore case, the fact that some of the strongest evidence of insanity was obtained from witnesses called by the proponents, shows that the claim of mental disease was as honestly made as it was ably and scientifically sustained by Dr. Gray.

E. H. Benn: When the paper in this case was read by Dr. Gray at a former meeting of the Society I got an impression that Mrs. Fillmore, at the time she made her will, was of unsound mind and that probate of the will ought to have been refused, while at the same time it seemed to me that it was a case where, according to the course and practice of the courts, the contestants could hardly expect such a result. In other words, I then believed, as I now believe, the courts to be wrong in sustaining wills made by persons whose minds are affected to the extent so often shown. I do not think, however, that courts often go quite to the extent that the court did in this case.

On reading the paper, I find the case to be much stronger and clearer than it seemed to me when the paper was read, and I think a decision of the court rejecting the will and refusing

probate would have been sustained by authority, and would have been more in accordance with the adjudications of the courts than the decision made as it was. It is not the fault of our laws, nor because of any defect in our laws, that such wills are sustained.

By statute "all persons except idiots, *persons of unsound mind* and infants, may devise their real estate," and in case of personal property, persons of proper age "*of sound mind and memory and no others* may give and bequeath his or her personal estate by will in writing."

This right and all the right a person has to dispose of property by will in this State is fixed and limited by these statutes, by which it will be seen that no person of *unsound mind* can make a valid will. We of course have no statute declaring or determining what is unsoundness of mind, and that has in all cases to be determined by the courts, and each case must be determined by the facts of that particular case, and as different persons may arrive at different conclusions from the same state of facts, it is not surprising that wrong decisions are often made.

But there can be no excuse for disregarding such medical evidence and scientific tests as, according to the universal judgment of mankind, establishes insanity, or unsoundness of mind, or in giving the term a definition which the law-makers never could have contemplated, and which is contrary to the universal acceptation of the term. Although a court may have the physical power, it never has a legal or moral right to give a judgment contrary to law or the evidence. If in this case there has been a wrong decision, the fault is the fault of the court, and not of the statutes.

We have many reported cases where wills made by persons acting strangely have been sustained, notwithstanding the disposition of the property has been unfair and unjust, and the surrogate in this case may have supposed that he was justified by precedent in sustaining the will.

In the case of Abraham G. Thompson's will (2 Bradford's Rep. 449, 21 Barb. Rep., 107) the testator was shown to have had strange delusions, a mere detail of which would be sufficient for a whole lecture, and cannot therefore be enumerated here. Among other things it was proved that he got a man who had an unusual quantity of what he called the water of life in him, to acts as rodsman in finding Kidd's treasure, and when he found it, just as he broke the turf, a bull, as he said, came over the hill which looked as big as a mountain, pawing and throwing dirt, fol-

lowed by nearly a thousand cattle. At one time he sold for a mere trifle a valuable span of horses which he had just bought, because of a dream a woman had, who, as he said, always dreamed right.

He sought for the philosopher's stone, and in order to get it he said he had set apart a house, and had a man consecrated to the work, and everything about it was consecrated.

The room was carpeted and lined with Irish linen. He kept wax candles burning there forty days and forty nights without going out.

That was, he said, because Moses was in the mountain forty days, and our Saviour fasted forty days.

The man must not eat after sunrise nor before sunset, and then must eat only unleavened bread or Boston crackers, etc. Perfumes were kept burning in the room, and the man was dressed in white Irish linen.

This was to obtain the philosopher's stone, and to call in the planetary spirits whom he could command, and who would obey whatever he said.

In describing a process by which he could get the philosopher's stone, to another person, he said he must line a room with white Irish linen and must get a man in there and keep him drunk on beer, or London porter, for six months, and at the end of that time the man's urine would be the water of life, and he could then complete the philosopher's stone, and with that he could know what every person was about, in the earth, under the earth, and in Heaven.

He said he had done that, and got Dr. Clapp in to talk to the spirits to get the ingredients for the philosopher's stone, and that he had forty wax candles burning in the room while the operator was at work.

These are but a few of his delusions and strange acts, yet his will was sustained, it appearing that he was competent to transact business, was a director in incorporated institutions, and although having these peculiarities and delirious on such subjects, the courts held that he was not of unsound mind, or incapable of making a rational disposition of his property. This case certainly is a border case, and without considering the question whether it was decided right or wrong, I select and refer to it as one case to show how far some of our courts do go in sustaining wills of persons who have delusions, and also for the purpose of showing the distinction between that case and this.

Thompson had strange delusions, and was exceedingly super-

stitious. But it was not shown that he had any disease impairing his mental faculties, or that there was any change for the worse during any period of his life, whereas in this case, as is very clearly shown by Dr. Gray, Mrs. Fillmore had a disease of the arteries, or of arteries leading to the brain, which would naturally affect the brain and mind just about as she was affected; that her condition was the natural effect of such a disease, and that the alteration or change in her conduct dated from that time, and her conduct from that time was such as a lady in a healthy state would never be guilty of, and which continued while her physical powers remained, and until she was unable to talk. Her unreasonable and irrational conduct was strikingly manifested at the time of making her will.

Her conduct on that occasion was enough to show her unfit to make a will; and, as it seems to me, probate of the will should have been refused on proof of those facts alone.

I do not know how Mrs. Fillmore disposed of her property, or whether or not she made a just disposition of it. That would have an important bearing on the question, for if she got an insane delusion in regard to some relative, or object of her bounty, which affected her disposition of her property, that alone would be sufficient within numerous decisions of our Courts to invalidate the will; whereas if her delusions, like those of Thompson before mentioned, and many others I might name, related solely to other matters, they would not (as our Courts sometimes hold) be considered as affecting the will in question. Mrs. Fillmore's mind seemed to be affected generally. She was liable to go wrong on any subject that arose, and if the Courts are right on the subject of insanity, she was insane.

In the matter of Forman's Will (54 Barb., 274), the Judge, in delivering the opinion of the Court, at page 289, says: "The only legal test of insanity is delusion. Insane delusion consists in a belief of facts which no rational person would believe."

According to this Mrs. Fillmore, as she not only had delusions, but she believed facts which no rational person would believe, was insane, and as she is proved to be just as insane on one subject as another, there was no subject on which, according to the proof, she could be said to be sane. She was then incapable of making a will.

Dr. Francis Willis, in a treatise on mental derangement, says: "A sound mind is one *wholly* free from delusions."

Taylor, in his work on Medical Jurisprudence, says: "The main characteristic of insanity in a legal view is said to be the

existence of delusion; *i. e.*, that a person should believe something to exist which does not exist, and that he should act upon this belief."

These definitions our Courts adopt, or profess to adopt, and if Mrs. Fillmore, when she made her will, was not "wholly free from delusions," or if she, without cause, "believed that to exist which did not exist, and acted upon that belief," she was, according to these definitions, incapable, under our statutes, of making a will.

It is the sudden changes in character and conduct which medical writers regard as most satisfactory evidence of insanity, and as they say, the soundness or unsoundness of mind of the individual is best determined by comparing him, not with others, but with himself.

Comparing Mrs. Fillmore before 1877 with Mrs. Fillmore after 1877, we find her changed from a refined lady to a coarse, unrefined, unreasonable woman; incapable of self-control, having delusions on various subjects, believing what no rational person would believe, and acting on that belief, and this change in temper, disposition, and character we find to have been preceded by a physical disease, which, as has been very clearly shown by Dr. Gray, would naturally and necessarily affect the brain, and produce the very condition in her which the evidence in this case discloses.

Mrs. Fillmore then, within the medical and legal definitions of insanity, was of unsound mind before, at the time of making, and after she made her will, and instead of being admitted to probate, it should have been held void, and probate refused. The fault is not in the law, but in the administration of the law. On the facts as disclosed by the paper read by Dr. Gray, the decision of the Court, in admitting the will to probate, was simply wrong, contrary to the evidence and contrary to law.

S. B. LIVINGSTON, ESQ.: I desire, before passing any criticism upon the paper under discussion, to testify to the admirable quality of the form and style with which the whole subject was presented by the author. So far as I can recollect, it was not excelled in that respect by any other paper, except it may be by a paper by the same author. I refer to the paper on the Maggie Keppel case. A brief parallel between these two papers will best illustrate the nature of the criticism which I have to make on the present one. Both are remarkable for fullness of statement and clearness in the presentation of facts, and both of them are conclusive up to a certain point. The Maggie Keppel paper, how-

ever to my mind, had all the force of a demonstration. The present paper seems to me to be equally conclusive, so far as the author seeks to show that Mrs. Fillmore was, from a scientific point of view, a person of diseased brain. But the conclusion that the paper propounded as her will was invalid is, in my judgment, not supported by the array of facts presented upon the other point. I do not for one moment presume to question the Doctor's conclusions upon the question of the state of mind of his patient within the limits of his own science. Indeed, I am glad that we have with us so competent an authority upon the medical aspect of the case; but the question whether Mrs. Fillmore's will was void or not, cannot be decided from a medical standpoint alone. In the paper on the Maggie Keppel case the author had the subject under his personal observation, and his conclusion was, as it were, a scientific judgment that Maggie Keppel was insane. In the case under discussion it was quite the reverse. The Doctor was obliged to base his judgment on a mass of evidence, some of which was disputed, part of which was contradictory, and concludes that Mrs. Fillmore was insane, and seeks to give to his ultimate conclusion that her will was invalid, the same force and effect as to his conclusion that the decedent had a diseased brain. The question of the validity of the will is not, however, a pure, scientific deduction, and the opinion of the expert on that point is not entitled to the same weight and confidence which we willingly allow to his conclusion on a purely medical question.

I agree with most of my colleagues, who preceded me to-night, that no judgment as to the validity of the paper, which is, finally, a question of law, can be determined without an examination of the paper itself with relation to the surroundings of the testatrix, and, as the paper, so admirable in all other respects, fails to present those facts, its conclusion upon the validity or invalidity of the will seems to me to be inconsequent. The facts presented by the Doctor as to the condition of the patient's brain at the time of the making of the will and codicil raise grave doubts as to the validity of the paper, but I do not think that any other deduction can be made with safety. And, indeed, this unfortunate woman, in spite of all the facts arrayed in the paper, may have been able to concentrate her enfeebled mind upon the matter of the drawing of her will, and have produced a valid instrument.

It is almost idle to array medical testimony against a paper which in itself, shows an intelligent appreciation of the matter in hand, and betrays no inherent evidence of an unhealthy condition of mind. For aught we can learn from this paper, Mrs. Fillmore

made a just and equitable distribution of her property, and she performed a valid and intelligent act. There have been numerous attempts to set aside wills by indubitable proof of general failure of mind and body, accompanied by proof of eccentric habits, etc.; but whenever the will itself has given evidence of intelligence and sound motives, these attempts have generally failed. The case of the Sarah Burr will is an instance of this kind. There was proof of change of habits and penuriousness in spite of the possession of great wealth, eccentricities in dress, and in manner of living. Yet, as the will itself was a most intelligent instrument, distributing the large estate of the decedent to numerous charities, and evincing that, under these eccentricities and this failure of mind, the testatrix still preserved a just notion of what her estate consisted of, and a perfectly sound and, indeed, public-spirited view, as to the best way of disposing of it. The will was sustained.

The freedom of testamentary disposition under our theories of law is almost as great as the power of disposition during life. The grounds for such freedom are deeply rooted in the civil polity of the English-speaking races. No man's will can be questioned on account of ignorance or prejudice, or even gross injustice, toward those who have claims upon his bounty, where the mind is not impaired, any more than they would be available to set aside acts performed during life. No one can question that the power of testamentary disposition is frequently abused in hands of ignorant and bad men, yet as we believe that freedom of testamentary disposition is the soundest and safest policy and best secures all the ends in view, we permit persons of all grades of ignorance to make such wills, practically, as they may see fit. Why should we, then, hold that an intelligent disposition of the property should be set aside because the medical evidence shows simply that the brain of the testator has suffered deterioration, or has become enfeebled by disease? Such efforts have been almost universally unsuccessful. We look for a corroboration of the mental condition of the testatrix in the paper itself. It is true that in France there is a limitation upon the testamentary capacity. I am not prepared to enter upon the discussion as to the wisdom of this policy as contrasted with our own; but we know it has been attended with serious and shocking results in many cases in France, where the heirs, relieved from dependence by provision of the law, very frequently seek to hasten, if they do not actually put to death, many aged persons. It is likewise true that, in theory and to a degree, in fact, if the mind of the testator is shown to be wholly diseased, there can be no valid will. But where the circumstances attending the execu-

tion of the instrument cannot be attached and the will is on its face a sound instrument, the medical testimony can hardly be strong enough to overcome the presumption of sanity growing out of the instrument and the facts of its execution. So that a statement of the exception is only another form of proving the general truth I have laid down.

Consideration of the kind suggested in the various criticisms to-night may have moved the learned Judge to support the will in spite of the strong medical evidence which seems to have been presented to the Court. If so, I must differ from the Doctor's conclusions that any profound error was necessarily made in sustaining Mrs. Fillmore's will.

DR. GRAY was then called upon by the President to close the debate. He said:

I am glad that Judge Hull expressed such kindly feelings towards me—feelings which, it is unnecessary to state, I fully reciprocate — because I shall find it necessary to use plain language in answering his criticisms as he did in making them. The truth of the matter is, that I fear Judge Hull would not know a lunatic if he met one on the street; and I think I shall have to take him some fine morning to the Flatbush Lunatic Asylum and demonstrate to him how seemingly rational some incurable lunatics are. His idea of insanity is the ideal one of the lawyer, not the practical picture which the experienced alienist has before his eyes. My opinion of Mrs. Fillmore's insanity was not based upon any symptom standing alone, but upon all the symptoms taken together. The nocturnal scene; as described by the professional nurse, and which Judge Hull deems of such slight importance, makes evident, it seems to me, his lack of practical acquaintance with the insane. I can only reiterate my opinion of its value, and then leave the matter as it stands—the opinion of Dr. Gray, who has had some little experience in the observation of the insane, and who devoted some time to the study of them, against the opinion of Judge Hull, who has probably had no experience with the insane, and has devoted relatively little time to the study of them. Judge Hall is mistaken in supposing that I said nothing about the decision in the case. (Dr. Gray then read from his paper a paragraph in which the decision is mentioned.) As to the criticisms that I did not go fully enough into the details, I think that, as I stated in opening my paper, it would not have been feasible to do. The testimony covered over 3,000 written folios, and I was therefore, forced to summarize. Had I not done so, my paper would have been of such length that all of you would have been

in the happy condition of some of your members at the present moment. (Three or four members had gone fast asleep and were snoring loudly.) I did this the more unhesitatingly, because I spent many weary weeks in carefully weighing the testimony, for my understanding with counsel had been that I was to be at liberty to return home unless the testimony proved Mrs. Fillmore's insanity. I wrote the paper from the physician's point of view, not from the lawyer's. It was not with me a question as to whether Mrs. Fillmore had testamentary capacity. It was a question of whether she was insane. Proven insane, she had, in my opinion as an alienist, no testamentary capacity; for alienistic science has proven that a mind that is really insane in any degree, however limited, cannot be trusted in any matter requiring rational comparison and appreciation of things and matters. It may be that the science of the future will enable us to discriminate enough to say exactly when a man's insanity ends and when his sanity begins, if it be, indeed, possible that sanity and insanity can co-exist in the same mind. At the present day, however, it is utterly impossible to do this, however much lawyers may argue to the contrary; and the only position that is warranted by our science is, that a man insane at all is, presumably, altogether unbalanced. It is for this reason that I must join issue with Mr. Livingston in his statement that testamentary capacity is not a scientific question which should be determined by the expert. Dr. Spitzka falls, it would seem to me, into the same error which he deprecates in Judge Hull—of assuming that I based my opinion of Mrs. Fillmore's insanity upon any one person's testimony. I myself had grave doubts at first about the reliability of the coachman's testimony, and frankly expressed them to the counsel; but further knowledge of the man, and the corroboration of his testimony by other witnesses, caused me to feel before the trial was over that I had done him injustice. But this debate has been especially interesting to me in one especial point of view, and that is, that it has illustrated so well the different standpoint from which the lawyer and the physician regard insanity. The former defines it, marks out its limits with the nicety of an engineer, determines with mathematical accuracy just where sanity begins, and thus constructs a chart by which an office-boy could determine testamentary capacity. The latter, on the other hand, seldom defines insanity, for he has no desire to be haunted by a life-long remorse, does not attempt to determine its limits, and contents himself with studying the living samples as they come before him, and classifying them into groups, so that,

when years have rolled by, he feels himself competent, with careful observation of the particular case, to determine the presence or absence of mental disease.

A motion to postpone the discussion of Dr. Kiernan's paper having been made, it was moved to adjourn, the latter motion being carried.

Eighteenth Regular Meeting.

The eighteenth regular meeting of this Society was held on the evening of October 9th, 1884. In the absence of the President and Vice-President, the Society, having been called to order, elected Judge Hull to preside. The minutes of the preceding meeting having been read, Dr. Spitzka moved to have the clause, beginning with the words "although that Society, etc.," erased from the minutes. Seconded, and carried. The minutes were then adopted as read.

The Board of Trustees then reported that their meeting had been adjourned to the Academy of Medicine on October 9th, at 7:30 P.M., and that they would meet again at 137 East Fiftieth street on November 3d. They had obtained the consent of Dr. Wm. L. Hardy to read a paper on "The Rhinelander Case" for the November meeting.

The paper of the evening, entitled "An Argument Against the Hangman's Bungling," was then read by Dr. N. E. Brill, and discussed by Mr. Benn, Judge Hull, Dr. Hardy, Dr. Wood, Dr. Corning, Dr. Spitzka, and Dr. Harwood. The author of the paper closed the discussion.

AN ARGUMENT AGAINST THE HANGMAN'S BUNGLING.

BY

N. E. BRILL, A.M., M.D.

IN the first place let me state that I shall not speak of the question of the influence of capital punishment in its relation to the commission of crime, for the question is so foreign to the subject under consideration, since we shall deal only with the consideration of the enactment of the law, as it now exists, that we must exclude it from this paper.

All that the law requires is, that its enactment be carried into effect. The law stipulates that the culprit found guilty of murder shall be hanged by the neck until he is dead. In this case it decides the method of carrying out its provisions. Let us see why it limits itself to this method of inflicting capital punishment. Excluding the question of its deterring influence on the commission of murder by man, which we have tabooed, it seems to me to be the relic of that barbarous instinct of gloating over the sufferings of one who is the unhappy victim of its revengeful passion. A barbarous instinct, I say, which finds its antecedent in the tortures which all victims of savage races are put to, when they transgress. Hanging is essentially the mode of disposing of criminals deserving death in all tribes of Anglo Saxon origin; a race characterized by its stern and oppressive methods, and which has not as yet emancipated itself therefrom.

In my opinion the time is ripe for the introduction of

some less brutal, less savage method of disposing of the victims of the law's mandates. Or if we cannot overcome that conservatism which expresses itself in repugnance to the introduction of all novel methods, also a characteristic of the same race, surely the time has arrived for improving the method which now exists. England, the most renowned of all conservative governments, has better methods. It possesses an official hangman, one who is expert in the performance of his miserable duties, and who seldom fails to produce instantaneous death in his victim. I say seldom fails, for failure not very infrequently occurs, as it is bound to do, where so many elements exist over which the hangman, no matter how careful he be, has no control. How can he guide the knot after the trap is sprung or the weights fall, which are to jerk the individual from his feet? No matter how securely that knot be placed, the suddenness of the culprit being removed from *terra firma* will, as it often does, disturb its position. A broken neck is more often an accident in executions than it is a determinable and definite result.

Again, how can he be assured that the rope which passes through the knot will glide easily? Not by any carefulness exerted to have it do so, for how often does it not, even where every preliminary caution in testing it is taken. In an execution to which I was a painful witness, and which I shall later describe, both accidents happened.

Of course, with an expert executioner, these accidental elements will not occur as frequently as with a comparative tyro in the business. Still they are not, as I said, elements which can be guarded against, even with the greatest care. If, then, we must have hanging as the method of disposing of those criminals deserving of death, why should not the work be done by those whom experience has made sufficiently expert as to guard, as far as man can guard, against those factors which are mechani-

cal, and on that account not absolute, and hence destroy the efficient working of the method?

It would not be possible to have but one man perform all the executions in this country, as is done in England, on account of the vast extent of the territory, and the number of hangings which occur on the day stipulated by the law for such executions to take place; another conservatism, by the way, which still fetters us. Is not any other day as good as Friday? Still, that question is of comparative unimportance. I should suggest, then, the appointment of expert executioners, each of whom should perform all the executions in a defined district.

You are evidently unaware of the proportion of deaths from necks broken to those from strangulation. I took the trouble to look up the records of the official hangings in the United States, which were reported in the New York *Herald* during the entire year of 1883. Sixty-two were therein recorded—some, the accounts of the most horrible and sickening butcheries that the wildest fancy could conjure up. Of these *sixty-two* executions, the neck was broken in but *twenty-four* cases; in *twenty-eight*, strangulation, a most dreadful death, was the result; and in ten the details were either too meagre or entirely absent to give a trustworthy classification. Think of it, gentlemen, instantaneous death in only about 38 per cent of the cases. It would be but just to conclude of the ten uncertain cases that death did not take place immediately, for the papers, appreciating the horror with which a death by strangulation affects the people at large, are always ready to state decisively that a broken neck was the result, if they can plausibly do so, so that the percentage of the former class may perhaps be still less.

Even then, as you will be shown later in the evening, a broken neck is not necessarily fatal, although death from that cause is to be expected in the very great majority of

cases. Still, a result otherwise than fatal is an accident which may occur, and then we will have added to the excruciating pains of a fractured cervical vertebræ, the torture of a slow strangulation.

The reflex acts of the central nervous system are imperative in proportion to the urgency, that is the physiological necessity, of the act which they perform. The impetus to these acts is given by impressions, that is sensations, which are the more distressing the more essential to vitality the need is. Now, there is no act which is so fundamentally and imperatively necessary to the life of the animal as respiration. Cut off that function, and those most distressing sensations must inevitably follow.

The pain of a burn is severe, but it is only when the burn is extensive enough to cut off the cutaneous respiratory surface that it approaches in its agonizing character the pathic sensations of a strangulated person. If a number of persons experienced in pains were to be asked, which pain is most severe, they would say the pain of a burn; and those who devoted themselves to the science and art (!) of torture, resorted to fire as the most agonizing agent calculated to satisfy their vindictive or fanatical feelings against the person punished, if punishment can be spoken of in those cases. But many a person has unflinchingly borne the test of fire; no one can control the involuntary expressions of agony provoked by strangulation.

The deliberate suicide's struggles indicate that, notwithstanding the cool deliberation which characterizes persons who have hung themselves under the most discouraging circumstances, and their determination, this in a *physical* sense the most heroic determination, is incapable of carrying the individual through, what I consider, the most exquisite agony of which the animal frame is capable.

Throw a poisonous acid into a vessel containing gold fish, and exhaust the atmospheric air from another, and compare the death agony of the two.

A moment ago I compared the agony of death by extensive burning with that by strangulation. In both cases, the same imperative function was impaired—that of respiration. The difference, however, is that the severe burns referred to are always associated with shock, which diminishes pathic as well as general sensibility, while with death by hanging shock is not always produced. There are two elements calculated to produce shock at the commencement of a hanging process: the first is the predisposition of the sufferer, whose sensibilities may be blunted by abject fear. Secondly, if the constriction of the rope be sudden enough, the cutting off of the arterial circulation sufficiently rapid, life may pass away without much struggling or without consciousness. This is rare, on account of the fortuitous character of the combination, and, if it were the rule, it would be a singular feature of the execution of law: that it should put a premium upon cowardice.

Weighing all the facts in the aggregate, strangulation involves the most intense of all forms of suffering. As long as inefficient sheriff assistants perform the work, cases like the following will inevitably occur:

On July 7th, 1883, Joseph Brewster was hanged at Ysleta, Texas, for a criminal assault which he had committed. He went to the scaffold boldly, the noose was adjusted, and the trap sprung. He fell seven feet, when the knot, which was badly tied, slipped, the rope did not slide through the knot, so that he had to be hauled out of the trap after he had been hanging for one minute, and the knot readjusted, the agony of awaiting the fatal moment, which he had once undergone, repeated, and the

victim of the law's barbarity re-hanged. Fortunately at the second hanging his neck was broken.

At Savannah, Ga., on Sept. 29th, 1883, Geo. Wallace was hanged for murder. The prisoner was very nervous, so that the rope was adjusted with difficulty. The gallows was a very rickety structure, poorly built. At the signal of the sheriff, his assistants attempted to remove the upright post which supported the trap. They could not budge it, and in their exertions the scaffold swayed so violently that it threw the prisoner, whose hands and legs were securely tied, to the floor over the trap. Groans from the crowd and the fall of the doomed man frightened the assistants below, who thereupon left their post, and the unfortunate criminal was for the moment left to remain lying on the platform, from which, on account of his shackles, he could not move. Then arose shouts of "Let him fall as he lies," "No, no! bring a ladder and stand him on his feet," "Get on your knees, George," "Stand up, George;" whereupon two attendants ran for a ladder, and climbing up on the platform, raised the culprit to his feet, and the post underneath the trap being finally removed, the victim was slowly strangled to death.

Perhaps you will say that such horrors can only occur in small towns. If you believe so, listen to the following account of an execution which took place in one of the largest cities in the Union, and at which I had the misfortune to be present. I do not mention the city nor the name of the murderer, from motives which some of you can understand and appreciate. Wishing to study the psychical effects of an expected impending death, and to assist in the post-mortem examination of the prisoner's brain, induced me to attend.

On Aug. 1st of this year, by far the coolest person who walked in the procession to the gallows was the condemned. He showed none of the emotions which his im-

pending fate must have evoked. He was neither as nervous as the sheriff or the sheriff's chief deputy, nor as unsteady in his walk as most of the deputy sheriffs who followed him. He had listened to the reading of the death warrant almost nonchalantly, although he followed each word of its reading by looking over the chief deputy's shoulder; he then allowed the executioner, a tall, lank, ungainly fellow, to pinion his arms. The noose was placed negligently about his neck, and the march was taken to the gallows. At its foot, the prisoner was placed; and as he recognized some acquaintances in the motley crowd of spectators, he bowed his head, waved his pinioned arms and said good-by. The unfortunate wretch was kept standing under the gallows until one of the ministers of the gospel, more zealous for the safety of the prisoner's soul than in releasing him from the agony which he was inflicting by delaying the inevitable fatal moment, was not satisfied with the short prayer offered by his colleague who had preceded him, but kept the prisoner fully two minutes, with the black cap already drawn over the latter's face, until he had satisfied his conscience with the thought that he had performed his duty. This delay must have been a greater torture to the condemned than anything which preceded it could have produced. At the conclusion of the second divine's remarks, the signal to cut the rope holding the weights in place was given. A sudden thud was heard, and the head of the culprit being tossed to one side, he was suddenly lifted into the air. But horror! the knot had slipped, the rope did not glide through it, and there the prisoner hung with the knot immediately under his chin, and the rope so loose around his neck that a fist could have been placed between the knot and the neck. The hanging man tried to restrain himself from struggling, but the torture being unendurable, on account of that imperative need of air referred to, he articulated

something which sounded very much like "this is too much," and began those struggles which, finally tightening the encircling rope, produced a slow strangulation. In these movements, he loosened his arms, and with his right hand tore off the cap from his face. This was too much for the spectators, who had already appreciated the bungling method of the hanging; faces became pallid, men fainted, and others turned away from the sickening sight of the victim, fully conscious, looking at them with appealing eyes and being slowly murdered. The death was much more brutal than he ever thought to inflict on his victims. I was horrified at the sight; and was only held back from adding my weight to the hanging man, thinking by that means that the rope about his neck would be tightened, by the restraint of my companion, and the thought of an unenviable notoriety in the papers. It was with the greatest difficulty that I checked my anger, for the prisoner had already excited my compassion by the remarkable though unostentatious pluck and bravery which he had displayed, and by the expression of the hope to the sheriff that the latter would perform the work with haste and without bungling. If I desired, I could so detail a chapter of horrors in that execution which would not fail to produce the same effects on you as on the spectators there. But I much prefer to hasten over the subject, as even now I can behold the whole revolting scene. Suffice it to say that in my belief the tortured one was conscious for about three minutes, when with disappearing consciousness he became released from all pain and suffering. After hanging for more than one-half hour, life was declared extinct, and the body shortly afterwards was cut down. Who was to blame in this instance? Surely not the sheriff, for he did not do the work, and let me here say, in justice to him, that he was so affected at the scene that tears coursed down his cheeks, and the perspiration

rolled down in streams. The culpability rests with the hangman, but is usually undeservedly placed on the Sheriff, who is compelled to employ him.

Not very long ago, during an execution in Washington, the hangman thought that he would add sufficient weights so that in their fall they would increase the force which should act on the prisoner's neck. So they did, and to such an extent that the body was left standing at the foot of the gallows, and the head took an unexpected flight upwards. A most fortunate termination for the one who was to have been hanged, but not an enviable sight for the sheriff and his deputies; and demonstrating the fact that the nearer the approach to the use of all factors which shall produce sudden death, the greater the liability of the hanging becoming a mutilating decapitation.

Must such butcheries occur? Cannot the law be humane and allow some other mode of death? Why does it still adhere to and favor such brutality? Is not the death of its transgressor sufficient, but that it must torture him in a manner which the Inquisition, with all its terrors, could never exceed? It is in your power, gentlemen, and I hope you will exercise it, to change or modify the law. It is humanity which speaks, sympathy which asks for such action.

You may say, "Well, if you take away this method, what will you give us in its stead?" I would suggest one of two means, although I shall consider the most of those which have been offered to produce either euthanasia or sudden death. I must say that of all of these, the separation of the conscious centre from the rest of the body seems to me to be preferable; this is the result of the action of the guillotine and of the garotte.

The great objection which would be found against the production of euthanasia is the agony, which the culprit must endure whilst the means are in action, the terror and

dread which will take possession of him in anticipating the inevitable event. If chloroform or ether or a salt of morphia be used, we are met with the objection that special idiosyncrasies in the individual may make their action void. Especially may it be said of the latter drug; for there is no definite quantity which will produce a definite result. If the amount be too small, the desired effect will not be produced. If too large, the stomach will rebel and leave us in the same predicament, unless it be injected hypodermically.

Of electricity the objection is the same as that offered to the last measure. The shock may not be intense enough, and then have the same effect as a shock of lightning, which may not and often does not kill, for we know that different persons are affected differently by a certain quantity of electricity.

However, to return to drugs used in producing death, the one which is the most definite in its action is anhydrous hydrocyanic acid, commonly known as prussic acid. Of this a few drops is inevitably fatal. Here, again, we are opposed by the fact that to administer this, it would necessitate the compliance of the criminal, who, like the horse who is led to the water, might not be willing and hence could not be compelled to take that which is going to have a fatal effect, although, it is said, that the inhalation of a few drops of the drug has the same result as if taken internally. If this be so, and I have no reason to doubt that assertion, then this is the most desirable of those means mentioned for the production of euthanasia, as in addition death by prussic acid is almost immediate.

Of the mechanical methods the guillotine stands as the surest and most expeditious instrument. The lever holding the knife is released, the knife descends, and the culprit is, as far as consciousness is concerned, practically dead. There can be no hitch in the performance of its

work. It is inevitably fatal. No suffering on the part of the criminal is entailed, no bungling on the executioner's side possible.

If it be objected to that the corpse will thereby be mutilated, and that the sight of blood would be very revolting, we would say in extenuation that the mutilation is not much greater than that of a bungling hanging; and that nobody need attend an execution who is so affected by the sight of blood. It ought never be an object of the law to gratify the sight-seer, or to have any regard for his feelings. The sensibilities of the person who can witness unmoved such a sight as the one I saw, ought not to be affected by the wish of blood more than the employee of the slaughter-house.

Again, if the death penalty is to act as a deterrent, and publicity is to be one of its means by which it shall deter, we need but apply the line in Gœthe's "Faust": "Blut ist ein ganz besonderer Saft."

Moreover, the emotion of terror is in better harmony with the solemnity of an execution, than those of disgust and contempt. The sight of blood may provoke the former; but the spectacle of the lean, drawn out, limp form, dangling like a puppet in a harlequin show, has become a favorite one for the caricaturist, the subject of derisive applause in the lower theatres; and the dribbling fæces and urine are scarcely a fitting accompaniment to the transition from this world to another, so glowingly expatiated on by the clerical gentlemen, who usually are compelled to stand in unpleasant proximity to the disgusting scene. Still the same objections cannot be offered to the last means to be considered, viz.: the garotte. As an instrument of death it is just as expeditious, almost as certain as the guillotine. The crank is turned, the collar about the doomed individual is tightened, the pin enters the medulla oblongata, crushing it

and thus separating the brain from the rest of the body, producing the same effect as the guillotine, and at the same time producing asphyxia by crushing in the larynx.

Now, gentlemen, it remains with you to select whichever means related, you deem most desirable, or if there be any other instrument which can be devised, which would be devoid of the uncertain mechanical factors to which we have referred by adopting it, to release the condemned individual from the tortures which a bungling hangman inflicts. Is this Society not sufficiently influential in bringing this matter before the Legislature, or will we be compelled to await until a few more horrible hangings will so incense the people that they will rise up and revolt against the hangman and his instrument? If you wish to take up the matter, and this is not the time for delay, do it earnestly and thoroughly. Your action will awaken the public sympathy whose expression is now merely dormant, but which will undoubtedly find its life in your agitation of the subject, and in your action thereon. Show the law its brutality and do not try to dissimulate by calling it equity. Barbarity and injustice have no place in these times; for surely that is not justice which countenances horror and torture.

E. H. BENN: Mr. Chairman and gentlemen, it has never been my fortune or misfortune to witness the execution of a criminal, yet I have read so many descriptions of such scenes that I think I know as much about them as if I had seen them, or at least as much as I need to know to realize how horrible they are, yet I never supposed till I heard it to-night from the learned doctor whose able paper we have heard read that death by hanging was exceedingly painful, or caused, as he expressed it, excruciating pains. I have always supposed that by strangulation consciousness was soon lost, and that there was no more humane way of taking life than by hanging the person by the neck until he should be dead. My individual opinion is and always has been that no person should be executed as a punishment for crime.

If a man's conduct is such, or if, because of crime committed

by him, he is shown to be dangerous or unfit ever to be at large, he can, by solitary confinement, be entirely shut out from the world for the remainder of his life, and the world thus be as free from the risk of his ever committing any more crime as if he were actually dead. In that situation he would die soon enough without the aid of an executioner.

The object of punishment is not revenge, nor to inflict pain, but to prevent the offender from committing more or other crimes and to deter others by making punishment certain, all of which would be accomplished with quite as much certainty by solitary imprisonment for life. But if for certain offences the life of the criminal must be taken, I should favor, and I think this Society should recommend, the adoption of the quickest, most certain, and least terrible mode.

There are many ways by which life might be taken quickly and certainly, and, as I have reason to believe, without much if any pain; one is by the administration of prussic acid, yet there might be some difficulty in administering it. There are, as we all know, many other ways of taking the life of criminals sentenced to death, authorized by the laws of other countries, which I will not consider now. They all seem to me to be open to more objections than our old-fashioned way of hanging one by the neck until he is dead. Yet this hanging by the neck, which the learned author of the paper just read tells us, causes the most intense and excruciating pain ever endured by a mortal, is very, very often attended by accidents which, apart from physicial pain, must cause the most intense agony, and the peculiarity of it is, that such accidents are the result of bungling, which happens so often that an orderly and well-conducted execution seems to be the exception instead of the rule. It does not seem to me that there ever is or can be any good excuse for such an accident, or even for any delay in the execution of a criminal if he is to be executed at all. Such things can be avoided, and their occurrence should be made criminal.

We all agree that the prisoner should not be tortured, and that no unnecessary pain should be caused to him, and that his taking off should be as merciful and humane as possible, and we will all undoubtedly agree that if there is a more humane, quick, and painless mode of taking the life of the person to be executed, the law should provide for that mode of execution. I am not, however, convinced that there is, or can be devised any better way than that of hanging by the neck. It is the mode devised by law-makers in their wisdom long ago, and is the only mode of

execution ever known in this country, and could only be changed by statute. Such changes are never made for light or trifling causes. Unless it is clear that some substantial good will result from a change in a law that has existed for generations, we could not reasonably expect a change.

Governments are always reluctant to change any general statute, and such changes ought not to be made hastily, or without good and sufficient reasons.

I think there is little prospect of our government authorizing any departure from the old-fashioned way of executing murderers by hanging them by the neck until they shall be dead.

It will be more likely in the march of progress to abolish the death penalty entirely, which, in my opinion, would be a reform in the right direction.

AMOS G. HULL: Mr. President and gentlemen, the paper to which we have just listened is replete with matters of public interest, and is very opportune, as well as a very able and interesting paper.

It is opportune because there is a growing vice and tendency among certain classes to evade the law relating to public executions. Such views as the learned author of the paper has set forth will have a tendency to correct such evils.

The time was in this State, when public executions for capital offences were permitted upon the hills and plains, where thousands could be present.

The result was that around the gallows there would assemble a vast multitude of people, some from mere curiosity, a few for pity for the condemned criminal, but the great majority to gratify a morbid desire to see a brutal sight, to witness something barbaric, cruel, and revolting.

The effect was found to be extremely demoralizing. Philanthropists, through the Legislature, caused an act to be passed prohibiting public executions, and directing that the criminal should be executed within the walls of the prison or a yard adjoining the prison.

The Statute authorizes the Sheriff to invite, on three days' notice, to be present, the judges, district attorney, clerk, and the surrogate of the County, two physicians, twelve reputable citizens, and, at the request of the criminal, two ministers of the gospel.

The Sheriff may also invite such officers of the prison, deputies and constables, as he shall deem expedient, to be present. But no other person shall be permitted to be present.

But how shamefully has that statute been broken, in its letter,

in the case of Jackson mentioned in the paper in the evening, and how wrongfully is the *spirit* of the law evaded by the press in every similar case when there is an opportunity.

The sheriff in this case was bound to know the law.

He knew how many persons he was permitted by the statute to summon.

Instead of doing his duty, one of the leading papers published in Brooklyn gives the names of over three hundred persons who were invited by him to attend the execution. The same paper says that over five hundred persons witnessed the execution.

I believe it to have been a grave offence for the sheriff to have thus violated the law.

No wonder the poor, unfortunate hangman became excited and made mistakes in adjusting the noose, and made a "bungling job" of the horrid business in the midst of such a crowd.

But the press in this case and in like cases has a fearful responsibility.

What was done? Why, the leading paper of Brooklyn, a very able paper, a paper of great influence, which circulates, no doubt, in more than twenty thousand respectable families, had four columns of the details of that horridly disgusting execution printed and circulated among its readers.

So you see, Mr. President, that what the Legislature sought in its wisdom to shut out as far as possible from the eye, as a demoralizing and brutalizing sight, is paraded before the imagination, with all the coloring that astute, nimbled-fingered and imaginative reporters can depict.

I contend that such publications are demoralizing.

Can they be checked? I say yes, in a measure; but some of my friends will say, oh, you are attempting to abridge the liberty of the press.

I say, in reply, if the press publishes that which tends to a breach of the peace, or that which is manifestly against public morals, it ought to be bridled.

But it is already curtailed in much of its licentiousness. The press is prohibited by law from publishing obscene literature. It is not permitted to publish under severe penalties any matter relating to lotteries.

It is restrained by law in many ways.

It needs no argument to prove that what is too often published in the papers respecting the public execution of criminals, has a demoralizing effect upon certain classes of men, and is unfit and improper reading for youth.

Whatever publication tends directly to make criminals of youth should be prohibited by law.

What can be done?

I suggest that the Legislature be requested to pass a law: That no newspaper shall be permitted to publish any more of the details of any execution than the name of the criminal, the name of the sheriff, the name of the witnesses present, and the date of the execution.

What was there about this negro criminal that should fill four columns of a newspaper to gratify the morbid curiosity of nearly a thousand people to see the blasphemous mockery by which a miserable thief and cold-blooded murderer was, by some sort of mock religion, to be in a moment's time transported from the scaffold to glory?

The crime for which the culprit was hung was an atrocious one. The papers say as follows:

"He had been for a long time paying attention to a colored girl, named Annie Jackson, who was at the time 24 years old. His affection was reciprocated, and it was generally supposed that they were soon to be married. Jefferson had a brother named Celestial, of whom he became very jealous, supposing that he was trying to supplant him in the esteem of Annie Jackson.

"On the night of December 21st, 1882, a party of colored people consisting of Henry Hicks, Emma Jackson, Annie Jackson, Juliet Jackson and Celestial Jefferson were assembled in a frame shanty on an embankment about ten feet above the street on Buffalo avenue, near St. Mark's. As soon as Jefferson heard of their being there, he armed himself with a double-barrelled shot-gun and a long knife, and proceeded to the house. Creeping up to the window he peeped in, and, taking deadly aim, fired both barrels of his gun. The effect of the discharge was to instantly kill Henry Hicks, aged 50, and seriously wound Jefferson's brother, Celestial. Not content with the fiendish work he had accomplished, Jefferson rushed into the room and made vicious stabs with his knife at every one he met. His first victim was the old woman, Emma Jackson, whom he instantly killed by a terrible thrust in the breast. He then turned his attention to Annie Jackson, and stabbed her several times, inflicting wounds on the arms, breast and abdomen. She was not fatally injured, and recovered in a few weeks. Her sister, Juliet Jackson, was the only one of the party who escaped uninjured. Jefferson, not finding any other victims upon which to wreak his vengeance, ran away and hid himself under a frame building belonging to Dennis McCrosson,

on Park place, near Utica avenue, and which was used as a fireworks factory. He remained there all next day without anything to eat or drink, and was discovered toward evening by some boys who were playing near the building. He implored them not to reveal his identity or location, but they at once informed the police, and Sergeant Edward A. Gaus and Roundsman Peter J. Barry, of the Twelfth Precinct, were detailed to arrest him.

"On arriving at the place where he was concealed they ordered him to come out, but he refused and attempted to kill himself by shooting himself in the right ear with a revolver. The wound inflicted was only a slight one, and he was speedily secured.

"Jefferson's previous record was not a very honorable one. He was connected with the notorious Romer Best gang of thieves. He was arrested for theft on March 8th, 1877, and was sentenced to fifteen months' imprisonment by Judge Moore."

The learned author of the paper has suggested a less revolting mode of taking life than by hanging.

That would seem to be desirable.

It would seem to me that a commission could be selected by the Legislature composed of eminent doctors who would examine the subject and report, and if any improvement could be made on the present mode, let it be done.

DR. HARDY: Mr. President, I have a few observations to make. I think Dr. Brill's percentage of the culprits who die of a broken neck is too large. As I understand it, he bases his percentage upon the records as published in the press. I think these records are very faulty. During the past seven years I have seen the hangings that have occurred in the Tombs. None of them died of a broken neck, though two of them were published as such in the newspapers.

Now, in regard to the bungling that happens at hangings, I think a large proportion is irreparable from that mode of death. There are two ways to hang a man. One is to let him fall through a trap or pit, as is illustrated by mounting a man on a barrel and then kicking the barrel from under him. The other way is to jerk him suddenly off his feet into the air. The latter way is the one used at the Tombs. For the benefit of those who have never seen a hanging, let me describe one as it is done at the prison. First, there are two uprights placed on the stone pavement; these are connected by a cross-beam; from the centre of this cross-beam dangle a few feet of rope with a hook at the end of it. The other end runs into an inclosed space; to this end are attached iron weights sufficient to jerk a man off his feet. These weights

are held suspended about four feet from the ground by another rope till the moment of execution, when it is cut by an axe; this lets the weights fall, and the culprit is raised off his feet. Now, when a culprit is to be executed, his arms are bound behind him, a small noose is placed around his neck, with the slip under his left ear; this is done before he leaves the cell. In the end of this noose is a small iron ring, and when the culprit comes under the gallows this is attached to the hook that is dangling from the cross-beam. When a man is suddenly jerked off his feet, he rises in the air a greater distance than the weights have to fall; sometimes he rises high enough to cause his head to touch the cross-beam; then he has to fall a distance sufficient to make the rope tense. It is here, during the sudden jerking into the air and the corresponding fall, that the noose is liable to become misplaced, even when the greatest care is exercised, for the noose must be placed loose enough to allow the man to breathe until the moment of execution. This disarrangement of the noose is far less likely to occur when the culprit falls through a trap, as the rebound caused by the weight of his own body is very slight.

In regard to the pain in death by hanging, no one can speak positively about it. My own opinion is that consciousness is very quickly abolished, and thereby the sensibility to pain; and the convulsive movement of the arms and legs of the culprit, though a horrible sight to the on-lookers, is not felt or appreciated by the sufferer.

DR. C. S. WOOD: Mr. President, while admitting the value and scientific merits of the paper just read by its learned author, I must be allowed to differ in opinion from some of the conclusions enunciated therein, and without expressing an opinion upon the propriety of capital punishment in criminal cases, must accept the law as it stands, which declares that such punishment shall be by hanging. With regard to the humanity of the execution by hanging as compared with other modes of death, I am fully of the opinion that death by hanging, even where the neck is not broken, is comparatively painless, that sudden strangulation produces immediate unconsciousness, and that no suffering is experienced by the victim, that the contortions of the body, the struggling and the grimaces when the face can be seen, are only reflex phenomena, and are not in any sense evidences of suffering. Hanging with an unbroken neck may be likened unto a man asphyxiated by drowning, which, as is well known, causes no suffering so long as the state of asphyxia remains complete, but that it is only during the process of resuscitation that the pain and agony commence, and

continue until complete restoration is effected. Not many months since a paper was read before the Medico-Legal Society by one of its members, in which this subject was treated at length, giving the writer's personal experience of hanging himself repeatedly, being watched by other scientists for the purpose of demonstrating in his own person the sensations produced while strangulation was taking place, who states that, with the exception of a feeling of fulness of the head and ringing in the ears, there was no special suffering. It is a well-known fact that in our more remote Western settlements lynch-law is prevalent, that often a suspected person is hauled up with a rope over the limb of a tree, with a noose around his neck, and held as long as possible without producing death, and then let down again, and this repeated any number of times for the purpose of extorting a confession from the person of his own acts, or compelling him to reveal the names of his accomplices. I have conversed with men who were thus engaged a number of times, with reference to the fact (if such it be) whether such hanging, temporarily, was accompanied by much suffering, and the invariable reply was no, that the fears of the mob were the dominant ideas prevailing at the time, and not the painfulness of the playful process. We see cases occasionally where a person commits suicide by voluntarily lying down and immersing the face in a spring or dish of water, becomes asphyxiated, and dies in that condition, without any appearance of having struggled during the process ; of persons resting on their knees or stomach, and leaning forward, allow the front of the neck to press upon a rope or clothes-line prepared for the purpose, with only a part of the weight of the body resting upon the rope, and are found dead in that position, which seems to me convincing proof that the sufferings from strangulation are not great, else they would make use of the means to relieve themselves from it, so long as it is entirely under their own control.

My belief, therefore, is, that hanging, even where death takes place by strangulation, is as humane and as free from pain as any other form of capital punishment, not even excepting the guillotine, which does its work so quickly and so well. In a recent decapitation of a criminal in Paris, where this mode of execution is chiefly in vogue, a prominent scientist, in order to determine whether consciousness was instantly abolished, instructed the criminal to keep his eyes fixed upon him as long as possible, which the culprit agreed to do. The block was then so adjusted that the eyes of the culprit and the doctor could meet each other. After the head fell from the block, the eyes of the victim moved

from one position to another, as the observer changed his position, and continued so to do for several seconds, thus indicating a certain amount of consciousness. Yet, no one will believe that this head, severed from the body, had the capability of appreciating any bodily suffering. The motion of the eyes was reflex, and the effect of a decided mental impression produced and stamped upon the mind before death. Hence my belief as above stated, that practically, and in its humane aspect, death by hanging is not objectionable.

DR. SPITZKA: I have, like Dr. Wood, heard of the reports made of executions by vigilance committees and by lynchers. Yet I prefer to rest my preference for one or the other method of execution on the study of more accessible and reliable information. That the prevalent method of execution by hanging has led to countless exhibitions of a revolting and brutal character, I believe, cannot be denied. If there is any retributive element in the death-sentence, there ought to be an equal amount of inflicted bodily suffering—not a terrible amount inflicted in two cases, and an easy death in a third, as at present. Nor do I think that the appointment of an expert executioner is calculated to abate the difficulty. The one recently appointed from over two hundred and fifty competitors in England was an agent in a frightful scene which ensued in attempting to hang a murderess. As to the stories related by one of the speakers about the continued consciousness of the separated head where the guillotine has been employed, I have to see the first authentic account to support them. How far romance has gone in this direction, and how little judgment is shown by our medical journals, in copying items from the daily papers, and then from each other, is illustrated by an anecdote of Velpeau (I believe) which recently went the rounds. This fable has it that Valpeau told la-Pommerais before his execution to make a certain sign with the eyelid after his head had been cut off, in response to a preconcerted signal. La-Pommerais agreed, and his head kept the promise; the axe fell, the criminal's head rolled along the ground. Velpeau took it up, yelled the signal in his ear, and was horrified to see the signal repeated. The only extenuating circumstance about the story is that it appeared in the medical journals in that same season when sea-serpents, frogs, liberated from quarries, where they had been imbedded in stone for three million years, et cetera, people the columns of the provincial papers. With the sudden deprivation of blood, the division of both pneumogastrics, of the sympathetic cords, and the respiratory apparatus, it may be as-

sumed that unconsciousness is as instantaneously developed by decapitation as by any applicable method. It may be a bloodier spectacle, but we should not consider the spectacular element, however one might do so, in view of the words of Mephisto, "*Blut ist ein ganz besonderer Saft.*" There is a solemnity in such an execution which is altogether lacking in the harlequin-like fashion followed in Anglo-Saxon lands. I most fully indorse the physiological and humanitarian argumentation of the paper.

Dr. Brill closed the discussion.

The Secretary then read a letter received from our Honorary Member, Jabez Hogg, of England, who presented the Society with a pamphlet on the "Proceedings of the Society for the Study and Cure of Inebriety." Both were received, and on motion placed on file.

The Society then adjourned.

Nineteenth Regular Meeting, November 13th, 1884.

The nineteenth regular meeting of this Society was held at the usual time and place on Thursday evening, November 13th, 1884, the President occupying the chair. The minutes of the previous meeting being read and approved, the Trustees reported that they recommended Dr. G. W. Wells to the Society for election to active membership, and that the next meeting of their Board would be held at the residence of Dr. A. M. Jacobus, 131 West 48th Street.

Dr. Wells was then elected, the tellers, Messrs. Benn and Sackett, reporting a unanimous vote in favor of the candidate, sixteen votes being cast.

Dr. Wm. L. Hardy then read the paper of the evening, entitled "The Rhinelander Case," which was followed by the discussion, participated in by Mr. Benn, Mr. Russell, Mr. Osborn, Mr. Eller, Dr. Field, Mr. Livingston and Dr. Spitzka. Dr. Hardy closed the discussion.

THE RHINELANDER CASE.

BY

WM. L. HARDY, M.D.

MR. PRESIDENT AND FELLOW MEMBERS:—The subject I have chosen for this evening's paper is the recent trial of William C. Rhinelander before a Commission of Lunacy, in order to determine whether he was insane or not.

It has been one of the most important lunacy proceedings ever held in New York, on account, *first*, of the great wealth of the family to which Rhinelander belongs; *secondly*, of the fact that, though Rhinelander was under an indictment for an assault and liable to imprisonment for a term of years, the defence of insanity was not set up by him; and *thirdly*, to the great attention given to it by the press, mainly through the influence of Rhinelander's counsel, who would specially call the reporters together in the Tombs to give them additional information whenever he thought the newspapers were not paying sufficient attention to him or his client.

The history of the case is the following:

On the 19th day of June of this year, William C. Rhinelander, while in the office of Mr. John Drake, at 79 Cedar street, suddenly drew a revolver, and shot Mr. Drake, with the intention of killing him. The noise from the discharge of the revolver brought help to Mr. Drake, who was struggling with Rhinelander for the possession of the revolver, and Rhinelander was disarmed. There was no effort made to arrest Rhinelander, and he was allowed to take his leave; and it was not till the next day, when it was found that Mr. Drake was dangerously

wounded—he having received a compound fracture of the humerus—that Rhinelander was arrested and lodged in jail.

The usual legal proceedings in such cases were gone through with, and Rhinelander was indicted. On the day he was called to court, his family, through their counsel, presented affidavits, stating that Rhinelander was insane.

On these affidavits the Recorder appointed a commission to try the prisoner's sanity, though this was most strenuously objected to by the prisoner, who declared himself ready to stand trial, and that it was a conspiracy of his family to send him to the mad-house because he married against their wishes.

It appears that eight years previously Rhinelander married an Irish girl, who was a domestic in his father's family. This so displeased Rhinelander's grandfather that he disinherited him, and his father, after his marriage, had only seen him twice during eight years, and that was when they accidentally met in the street.

This story, when it was published in the papers, greatly interested the public, and through the efforts of Rhinelander's counsel, it was made to appear that these insanity proceedings were part of the conspiracy of his family against him for marrying beneath him in wealth and the social scale. This was similar to the Gosling case a few years ago, when it was said it was a persecution by Gosling's family, who were of the Jewish race, because he married a Christian. It caused him to be pronounced sane by a jury, though one month afterwards he was sent to a private asylum, and has since died there.

The history of the case we are considering, as substantiated by the sworn statement of witnesses, shows that it was not a persecution of Rhinelander's family, but an effort on their part to shield him from the consequences of what they considered the act of an irresponsible man;

After being disinherited by his grandfather, his father gradually increased his allowance from $800 a year to $5,000 a year, the sum he was receiving when he shot Mr. Drake.

This does not look like persecution, though it was continually claimed by his counsel that he was hounded into the act by the machinations of his family and Drake. And here let me say a word in regard to marriages like Rhinelander's. Parents in such cases are, as a rule, better judges than young and inexperienced persons just entering into the hard realities of life. The parents have been young themselves, they have brought up their children, and they have learned that such marriages, in the vast majority of cases—perhaps after a couple of years of love, sometimes from the beginning—are followed by bickerings, quarrels, and as has happened in Rhinelander's case, separation. Yet when such marriages are brought to the public notice, the public immediately takes sides with the young people, and blame the parents for having any objection at all to their children's marriage.

But see the revulsion of feeling and change of views that take place when a child of any individual of that public goes and does likewise.

Now to be able to judge of Rhinelander's mental condition properly, it is necessary to go back to his youth, for there is a streak of insanity running all through his life up till the time it culminated in the shooting of Mr. Drake.

While at college he was always moody and taciturn, kept to himself, and had no associates. He was generally known as a masturbator. I say generally known as a masturbator, for I must say that my experience is that masturbation is a very common vice among boys, though most boys practise the vice in secret, and say nothing about it. But with Rhinelander it was dif-

ferent; he practised it openly in the class-room, and was seen doing it on more than one occasion by his fellow-scholars. He was also noticed always keeping his hands in his pockets and rubbing his genitals. If the habit was not continued afterward, it was at least re-commenced while he was confined in the Tombs. Some of the keepers there saw him practising it, and swore to it. This was told to me, and, in my examination of him, I spoke to him about it, and he gave me the following excuse: He said that he had itching around the genitals, and, in scratching himself, it brought on an emission. That was his own explanation.

Now if this explanation was true, it shows great hyperæsthesia of the urethra in a married man of thirty years. As there was no urethral or bladder disease, the only inference is that the hyperæsthesia was due to abuse, even if his explanation were true. Another time, while he was at college, his fellow-students got up a mock duel. One sent him a challenge. Rhinelander took the challenge in earnest, and said that if his opponent did not come to time he would shoot him in the back. He was not able to see that he was being made a butt and an object of ridicule by his classmates.

About ten years ago he desired to go to Europe, but his father, instead, sent him to Florida to visit some relatives. When he had got as far as Savannah, instead of continuing his journey, he suddenly returned to New York and stopped at Earle's Hotel. He then thinks it necessary to disguise himself; so that his relatives will not know he is in New York. So he goes to a costumer's and has a wig and a pair of side-whiskers put on, and returns to the hotel. He came to the hotel with a smooth face, and then a few hours afterwards he appears at the same hotel with a pair of side-whiskers and a wig. He did not consider the attachés of the hotel would wonder at the marvellous

change a few hours could produce in his appearance. This and other queer actions of his drew attention to him, and he was arrested and taken to the police station as a suspicious character.

He married his wife in Newark, N. J., under an assumed name, and then went to live in Toronto, Canada, still under an assumed name. While there he telegraphed to Mr. Drake to come on—that he was in a devil of a scrape. Mr. Drake went on, expecting to find him mixed up in some illicit connection, but found him legally married instead.

Some three years ago, a difficulty arose between Rhinelander and a boarding-house keeper about a board bill, and the boarding-house keeper detained his trunks. He consulted Mr. Drake about it, and stated to Mr. Drake that he intended to go and insult the boarding-house keeper, so that the latter would slap his face, and then he would be justified in shooting him.

Ever since his marriage, eight years ago, he has constantly carried a pistol. He was on another occasion arrested and fined for shooting at an intoxicated man who happened to jostle against him. For years he has quarrelled with his wife and has separated from her a number of times. He imagined that his mother was the cause of some of the separations, though she had nothing to do with it. He spoke to Mr. Drake, and said that if his mother interfered between himself and his wife he would shoot his mother.

The most important delusion Rhinelander was laboring under—for it led to the shooting of Mr. Drake—was that Drake was constantly trying to separate him and his wife from the time of the marriage at the instigation of Rhinelander's family; and later, on his own account, for the purpose of having improper relations with Mrs. Rhinelander. Yet it can be

shown by letters written by Rhinelander to Mr. Drake down to 1881, five years after his marriage, and five years after Mr. Drake first endeavored to separate him from his wife, as he says now, that he writes to him as a friend, tells him his troubles, both domestic and otherwise, seeks his advice, and asks him to call at his house. The following are extracts from some of his letters. In December, 1877, he writes to Mr. Drake, after returning from Europe, as follows:

"The dressing-gown I bought you was a present, not a purchase on commission; if I had not known what you wanted I would have brought you something that perhaps you would not want."

In April, 1878, he writes: "Please let me have two hundred dollars for next Monday. . . . I came out last quarter with a deficit which it will be impossible to make up. . . . I think the least that might have been done would have been to have sent me the full quarter at once. But, of course, I know this does not lie with you." In May 1878, he writes the following note to Mr. Drake: "If you have nothing better to do, you might come in and take dinner with me to-morrow, at half-past one. You may not get anything very fine, but you won't get anything very bad. Dinner at half-past one sharp." In July, 1877, he writes: "Dear Mr. Drake:—In case my wife applies to you during the week at any time for money, I caution you against furnishing her with it; that is, if you intend charging it to my account."

The following letter, of Sept. 8th, 1881, shows what a gloomy and moody condition his mind was in at that time. He writes: "Dear Mr. Drake:—I came up here to the top of the Catskill Mountains expecting to find enjoyment and repose. I might as well have gone to hell to find them, and that is all I have to say about my summer excursion. Such being the case, I leave the Catskills a

hundred times worse off physically and mentally than when I entered them; and the sight of their destruction, levelled to the ground by some vast tornado, would be to me a finer sight than any of the great ones I have had from here. I have been—but what is the use of writing? I don't know what to do. I would like to sleep for one year without interruption."

This last letter was written five years after his marriage. All these letters show—and there were numerous other ones of the same tenor—that he considered Mr. Drake his friend, and that he told him of all his troubles. Yet at the present time he claims that Mr. Drake was his enemy and tried to separate him from his wife immediately after his marriage, and has continued to do so up to the present time. While in the Catskills, he was constantly bickering with his wife. Some friends of mine, who happened to be stopping one summer at the same place he was, told me privately that he almost suffocated his wife during the hot weather by not allowing her to have the windows of her room opened, for fear she would catch cold. Another time, when he had to go away for a day, he gave strict injunctions to the landlady not to allow his wife out of her room. They all considered him a crank.

For the last three years, there have been constant disagreements between himself and his wife; they would separate and come together again. He was in a constant state of turmoil and unrest; if not with his wife, it was with servants and boarding-house keepers. He has lived in over fifty boarding-houses during the last few years. Some would not keep him, saying he was a crank. Others he left on account of the behavior of his wife, as he claimed; he thought she received too much attention from the gentlemen-boarders; though, from all accounts except his own, his wife was a true and faithful wife to him. But she could not stand his insane jealousy and his tyranny in

all the petty affairs of every-day life. By the way of a digression here, I wish to call attention to the fact that his counsel, in their efforts to prove his sanity, did not call his wife to testify—the one person alone who for the past eight years knew more of him than any other living person. Her testimony would be worth more than all the testimony put together of his friends and casual acquaintances. She could give the history of their disagreements, their separations, their constant change of habitations, and the reasons for them. Her non-appearance as a witness is very significant, though she was in constant attendance on him in the prison and some days accompanied him to and from court.

Up to the time of the shooting, Rhinelander was a constant caller at Mr. Drake's office, as often as once a week. He made a confidant of him and told him about all his troubles with his wife, and even asked his advice about getting a divorce. A few times he brought his wife with him; and once, while there, they had a bitter personal quarrel. During his married life he never made any intimate friends or associates; it was like his life at college—he would repel, instead of attract, friendship.

From the testimony of different persons who had dealings with him, he was morose and egotistical, and would take umbrage at slight or no causes. It was also stated that he would get excited easily and become frenzied.

During the last few months Rhinelander's delusion about Mr. Drake became stronger and took a new addition. It was not only that Mr. Drake was trying to separate his wife from him for his family's sake, but that he was doing it for ulterior motives of his own—that it was for the purpose of gaining control over her and having improper relations with her, meaning sexual relations; and for the accomplishment of his purpose he had her to call frequently on him at his office.

Now, as a matter of fact, Mr. Drake only once saw Mrs. Rhinelander alone in his office, and that some time previous to the shooting. All the other times that he saw her she was in the company of her husband, and their object in coming was to tell him about their quarrels. When Rhinelander was asked on the witness stand the reasons he had for believing that Mr. Drake had such nefarious designs, he gave the following childish ones. He said that it was from certain impressions that he had formed from time to time during his visits to Mr. Drake's office, and from certain conversations which he had had with him, and from what he had heard him say to others. The following are samples of what Mr. Drake said on different occasions, as given by Rhinelander. That any woman's virtue could be bought—every woman had her price. Another was that a man could always excite a woman to do wrong if he knew how. Again he said it was not wrong for a married woman to spend an evening with a gentleman in an ice-cream saloon. Again he said it was not wrong for a married woman to allow a gentleman other than her husband in her apartment—her bedroom—with closed doors, day or night. Rhinelander further said that he was sitting in Mr. Drake's office one day, and a gentleman came in and commenced to tell Mr. Drake about some lady who had left her husband and went to live with another man. Rhinelander stated that Mr. Drake did not condemn this conduct, as it should be condemned by any pure-minded person, but simply said, " how foolish the woman was, that the man would throw her off when he got tired of her, and then she would have nobody."

These were all the reasons he could give for his delusion regarding Mr. Drake's intentions. Now, if Mr. Drake did say those things, how foolish and absurd was the delusion built upon them. For the confirmation of his belief that his wife called on Mr. Drake alone, he hired

an umbrella-peddler whom he had met in the street, at a dollar and a half a day, to act as a detective on his wife, to follow her everywhere, and to report to him. Such was the delusion that was in Rhinelander's mind on the day of the shooting. The following is the account of Rhinelander's manner and the reasons he gave immediately after the shooting to Mr. Douglass, who was attracted to the office by the report of the pistol. He says that he found Rhinelander in a great passion, almost in a state of frenzy. Rhinelander stated that he had shot Drake for the honor of his family. That when he entered Mr. Drake's office that day he found two chairs in close proximity, and having been told by the umbrella-peddler that his wife had been there that morning, he knew that his wife and Mr. Drake had occupied those chairs. He also said that he saw a glass that smelled of brandy, and from that he knew that Mr. Drake had improper intentions. He further stated that he had been playing with Drake; that he pretended he wanted to go to Europe, and he knew that Drake wanted him to go, so that he could have his wife to himself; that Rhinelander seemed surprised that he could not go away after the shooting; that he showed by his manner and his language that he had done a proper thing, and that he was justified in shooting Mr. Drake, and that all he had to do when he would be brought into court would be to say that he was a Rhinelander, and he would be let go. He also said that, if a man came between him and his wife, he could do what he pleased. His uncle, Mr. Oakley, who saw him a short while after the shooting, testified that, when he spoke to Rhinelander, he became very excited and worked up, and said that his wife had been at Mr. Drake's office that day; that he had been advised by a lawyer, who had told him he was justified in protecting his honor, and he had shot Mr. Drake to protect his honor and the honor of the

Rhinelander name. On being told that his wife had not been there that day, he said he knew she had, and that she had been locked up with Mr. Drake for several hours. Then he took two chairs and showed how his wife and Mr. Drake had sat. He also said that he had asked for a glass of water, and when he got the glass it smelled of brandy, and he was convinced that Mr. Drake offered his wife brandy for an improper purpose.

Both these witnesses concurred in stating that Rhinelander seemed in earnest in what he said, and that he thoroughly believed it; though greatly excited, he spoke with evident feeling and belief in the truth of his statement.

About ten days after the shooting, I saw Rhinelander for the first time. I had a number of subsequent interviews with him. His personal appearance and movements would strike any one as peculiar. He is tall, lanky and loose-jointed. He has a peculiar shambling gait, and walks with his head bent and one shoulder in advance, as if he was making his way through a gale of wind. His arms dangle at his sides, as if they were attached to his body by strings. He has peculiar, jerking motions of the body, such as jerking his head, suddenly hoisting up one shoulder and then the other. Again, while sitting he will suddenly throw his body partly around in the chair. He also keeps crossing and re-crossing his legs. These are not chronic movements, nor do they occur regularly. They seem to be movements caused by sudden voluntary impulses, partly automatic, but still under his control. The appearance of his face is rather striking; there is a lack of expression on his left side; this is especially noticeable when he becomes animated. The movement of the muscles of that side is sluggish, and there is not that play of expression as seen on his right side.

There are also slight tremors of the muscles of the left

side. His upper lip on the left side hangs quite pendulous; this is even quite apparent under his heavy mustache. When I had him to put out his tongue, it pointed markedly to the right side. There is also slight indistinctness of articulation, but this is only apparent when he becomes very excited, in which state I have seen him once or twice while he was confined in the Tombs.

On questioning him for the reasons he had for shooting Mr. Drake, he told me substantially the same reasons as he gave immediately after the shooting. He knew his wife was in the habit of visiting Mr. Drake's office alone; that she had been there that day, for the reason that he saw two chairs in close proximity and he was handed a glass of water that smelled of brandy, and from the latter fact he was positive Mr. Drake was trying to gain control over his wife for improper purposes. He stated to me also that he had intended to shoot Mr. Drake before, and was sorry that he had not done so on one occasion that his wife was with him, because she would then be a witness for him. I asked if he meant to kill him. He said he did. I asked if he was sorry that Mr. Drake had not died; he said no, that it was like a duel—when you pinked your man your honor was satisfied. He could not explain how shooting an unarmed man was like a duel except in the injury inflicted. When I asked him if he even thought about the probability of being sent to prison for his act, he said it was impossible, as no jury would ever convict him. In fact, his idea was that he should be applauded for the shooting, and that he had done a justifiable act which was apparent to every one and was necessary for his own honor. His manner throughout the different times I saw him was vain and egotistical, his reasons illogical, and he always showed an insane jealousy in speaking about his wife. He stated that a wife should not receive the least attention from any gentleman, even those

of common politeness, except with the express consent of her husband.

Now let us examine a little more in detail the reasons Rhinelander had for his suspicions against Mr. Drake, and for that purpose we will take the reasons as given by Rhinelander himself, when he was on the witness stand. These were given after he had been thoroughly advised by his counsel. I have given his reasons for believing that Mr. Drake had improper motives towards his wife. They were those phrases that I have quoted before, such as every woman has her price, and the various other ones that Rhinelander alleges Mr. Drake said in their numerous conversations. Put all these sayings together, and they mean nothing, yet from them he builds up an insane delusion. Now let us see what facts he has to make him believe that his wife went to Mr. Drake's office frequently without his consent. He says, it was from certain impressions he conceived from the conversations of the wife and Mr. Drake at different times. This was not unlikely in a man of his insane jealousy, though there was not the least ground for it. The Recorder says distinctly in setting aside the verdict of the commission, that there was no cause for such a belief, as there was nothing dishonorable in Mr. Drake's relations towards his wife. Another reason that he gave was that Robinson, the detective, told him, on the morning of the shooting, that his wife had been there that day. The way he engaged this umbrella peddler to act as a detective was in itself strange. According to his own account, he was sitting outside a stable in Brooklyn one day, when a man and a little girl came along, and asked him for some assistance. The man's abject appearance arouses his sympathy, and he immediately engages him to act as a spy on his own wife. To make him more presentable, he gave him an old colored shirt of his own. Was that not a slight acquaintance and

a strange character to engage as a detective? On such a man he was going to rely, and to believe anything he might say derogatory to his own wife.

With his preconceived notion, he enters Mr. Drake's office and sees two chairs in juxtaposition before a window, which looked out upon a large building opposite where a large number of men were engaged. From this he concludes that his wife and Mr. Drake sat in those chairs in too close a proximity, and that they were seen by the men who worked in the building opposite, and thereby his honor was compromised. To further confirm his suspicions, he asks Mr. Drake for a glass of brandy, though he is not a drinking man. Mr. Drake said he had none; then he asked for a glass of water. The water was brought to him in a pony glass, such as are used in bar-rooms; after drinking it he said he detected the smell of brandy. From this he reasoned that Mr. Drake offered his wife brandy for improper purposes, that his wife refused, then Mr. Drake drank the brandy himself. Then when Rhinelander asked for brandy and wine, Mr. Drake denied having any in the office, in order to conceal what he had done. Now it was on these flimsy reasons, as given by Rhinelander himself during his examination, that he shot Mr. Drake. The latter stated that he and Rhinelander had some conversation after he had entered his office; he then resumed his writing at his desk; from this he was aroused by hearing Rhinelander saying in a loud voice, "You are the man," and looking up he saw Rhinelander rushing towards him with a pistol. Rhinelander's account of the shooting differs somewhat, though it shows what slight grounds he had for his delusion. They had had a conversation about Rhinelander going to Europe; they both agree about that. Though Mr. Drake says it was Rhinelander who first proposed it, the latter says it was Mr. Drake who wished to send him to Europe. The

following are Rhinelander's own words in speaking about leaving the country: "I said to him, if I went anywhere, I should prefer Europe. 'Well,' he said, 'I do not know but it would be a good thing for you to do; shall I buy a ticket for you?' Said I, 'When?' meaning for what period, for what day. Said he, 'Well, steamers leave on Saturday, you know.' I said, 'What about my wife?' 'Oh,' he said 'leave her here;' and he said, also, 'I will look after her.' I said, 'I don't want to take a step that is irrevocable; if I were to get upon a steamer and go to Europe, I might not return for a very long while; I might never return. I said, therefore, I would rather not leave my my wife and go to Europe.' He said, 'You need have no fear to leave your wife; she is too plain-looking for another man to take an interest in her.' I said to him that I did not think I would do it after all. I said, 'You know my wife is a foreigner, don't you?' 'Oh, yes.' 'Well,' said I, 'you know that foreign ladies coming to America, where the customs are very different, are not able to be so careful in their conduct as to appearances as American women.' I said they are innocent certainly—mentioning one or two countries particularly; I mentioned Germany and I mentioned Ireland. I said they came here with a very proper regard for Americans, and if they become associated with unprincipled people—men who are not altogether as honorable as they should be—they may without doing anything wrong, even meaning wrong, even without meaning to appear wrong, they may be compromised by such men. 'And now,' I said, 'you are the man who has compromised my wife.' He thereupon, without giving me a chance to say more, raised up, and as he did so right by the window where there was a cane, he incidentally made a motion behind him—not a very positive motion, but still a motion, so that I could not tell whether he meant to grasp the cane, or whether he meant to reach his hip-

pocket. That act of his hastened an act of mine which I should have committed unless he had given me complete satisfaction some other way. And I drew up on him and sent a bullet into him."

Now to judge of Rhinelander's insanity you must group together all the incidents and actions of his life, and look upon them as a whole, like the successive links in a chain. You must not take each incident in itself, and try to explain it away, as was done by his counsel, and is always done in similar cases. A medical witness is asked if a certain single symptom of itself indicates insanity. Then other symptoms are taken and the same question asked. Now as a medical man does not form his opinion from any single symptom alone, the answer in the majority of cases must be "No." Therefore a counsel, by pinning a medical witness to a particular symptom, and getting "No" for an answer, shows an apparent inconsistency. You might as well ask a physician to make a diagnosis of typhoid fever from a single symptom.

In looking over Rhinelander's life, you find that he is a man who forms no intimate friends or associates from his college days to the present time; that he is excitable, with exaggerated ideas of his own importance, and everything belonging to him; that he is constantly changing his abode; that he is suspicious and distrustful, as is shown by his jealousy of his wife and his numerous threats to shoot people. He imagines that every one is persecuting him, and trying to get the best of him. He is a man of illogical and faulty reasoning powers, as is shown in the mock duel during his collegiate days; the silly attempt to disguise himself by wearing false whiskers, and the trivial reasons he gives for shooting Mr. Drake.

Because his memory was retentive, and he showed a certain shrewdness and finesse in answering questions on the witness stand, and the way he interpreted some of his

acts, made a large part of the public believe that he was the victim of a conspiracy. But when you dissect his acts and statements, and compare them with the statements of other persons about the same thing, you will see inconsistency, imbecility, illogical reasoning, insane delusions, and perverted judgment all through his career.

From Rhinelander's history and acts, and my personal examinations, my judgment is that Rhinelander is an insane man, and has been so for years. He has that form of insanity called primary monomania, complicated at the present time with the physical, and some of the mental, symptoms of general paresis. This form of insanity will satisfactorily explain his foolish and imbecile acts, combined with an apparent shrewdness and smartness, while on the witness stand. It was the latter trait that caused Commissioner Patterson to disagree with his colleagues, and the Recorder to set aside the verdict of the Commission.

I shall not say much about the medical expert testimony of either side. For the prosecuting, it was very conflicting in stating the form of insanity. That was partly due to the difficulty of classifying Rhinelander's form of insanity, and also to the fact that two of the witnesses based their opinion from the hypothetical questions asked them, and the slight examination they were able to have by looking at Rhinelander while he was in the court room. Of the medical testimony for the defence, I shall also have little to say. Dr. Dimon was the only one who had had any experience with the insane. Dr. Dimon admitted that Rhinelander had slight tremors of the muscles of the left side of the face, but attached no importance to it. When asked how many cases of general paresis he had examined, he said "two." Dr. Milne, another expert for the defence, explained the difference in appearance of the two sides of the face, and the falling of the upper lip by saying there

were decayed teeth on that side, and attributing all the symptoms to that cause.

In conclusion, I shall give the following quotation from page 308 of Dr. Spitzka's work on insanity, and which was cited by Mr. Bowers, the counsel for the prosecution in his argument. I think it fits Rhinelander's case admirably except that there is added to it now the physical symptom of general paresis: "While attention has been called by more than one of the classical writers on insanity to the fact that intellectual faculties in this condition may be excellent, and the judgment on ordinary matters unimpaired, yet there is seldom any higher ability."

"These subjects may succeed in a routine calling, but they are rarely capable of a sustained movement in an original direction. The remarkable exceptions recorded prove the rule. Usually their conceits are bizarre rather than productive; their reasoning paradoxical rather than logical, and their argumentation tricky and shrewd rather than substantial. To the laity, such subjects often appear to be brighter than the common run of mankind, because common oddity is taken for brilliancy, and unblushing impudence for merit. When the whole career of such subjects is followed up, it is found to be exceedingly checkered; and vagabondage, theft and fraud are often prominent incidents of their life.

"Sexual perversion has been noted . . . Pinel the nephew describes such subjects as turbulent, indocile, quick to anger, commit outrageous acts which they are always ready to justify by plausible reasons, and who are to their families, their kindred, and their friends continued subjects of anxiety and grief. They are continually doing wrong either by neglect, by malice, or by wickedness."

E. H. BENN: Mr. President, the subject of Rhinelander's insanity is one that I am hardly prepared to discuss this evening. I have never even read the evidence in the case, and have learned more of the facts from hearing the paper read by Dr. Hardy this evening than I ever knew before.

It is true I have at times glanced over evidence taken in the case as printed in the daily papers, and from that and from what I so often heard said upon the subject, I got a very decided impression that Rhinelander was not insane, and notwithstanding what is said by Dr. Hardy in his able and well-written paper, I am of the same opinion still. I am sure that as strong a case in support of the view that Rhinelander is insane, as can be made from the facts, is made by Dr. Hardy, and great respect is certainly due to the views of one who, by education and practice, is peculiarly qualified to judge in such matters; still his opinions are but conclusions drawn from certain undisputed facts, and from the same facts another person may arrive at an opposite conclusion.

I do not think the facts admitted or proved warrant the conclusion that Rhinelander is insane.

Some or many of Rhinelander's actions were peculiar, but we find peculiar people all around us every day, yet we do not consider ourselves justified in believing them insane for that reason. We find people unreasonable, and many times having opinions which we believe to be absurd; but that does not make them insane, nor does it follow that they are insane because they are eccentric, nor does it follow because they have personal peculiarities that they are lunatics or irresponsible for their acts. If all such persons are insane, the insane are a majority in this country, and if the proof of such facts is sufficient to establish insanity, I have no doubt we could just as easily prove Rhinelander's father or grandfather, or almost any other man in the community insane. It is true the doctor does not claim that any one of these acts or peculiarities would be sufficient alone to prove him insane, but that all combined or the number of them is what makes the difference. But if one peculiarity alone does not impair the mind, it seems to me that should be left out of the account, and so of another and another, and so, if none of them cause disease of the brain or disorder of the mind, I do not see how they can amount to more than peculiarities after all, and unless the doctors make a distinction between insanity in a medical point of view and insanity in a legal point of view, a man, merely because he is unreasonable, or has peculiarities such as Rhinelander

is shown to have, cannot be held to be insane, that is, in such a condition as not to be responsible criminally for any act he does.

To be insane according to the legal test, he must have delusions, he must believe the facts to exist that he has no possible ground for believing, and what no rational man would believe; and to be in a condition to be excused from punishment for the commission of a crime, he must, in the language of the courts, at the time of committing the act, "be laboring under such a defect of reason from disease of the mind as not to know the nature or quality of the act he was doing, or if he did know it, that he did not know he was doing what was wrong." And within this rule, it is not held to be sufficient to exempt a man from punishment that, when committing the crime, he believes he is doing right, for even if acting under an insane delusion of redressing or avenging a supposed wrong, he is still liable if he knew he was acting contrary to law.

In this case it cannot, I think, be claimed that when Rhinelander shot Mr. Drake, he did not know that the act was contrary to law.

He evidently expected to be arrested and prosecuted, but like many other persons in the community, he supposed a jury would justify and acquit him because he was avenging or believed he was avenging an insult to his wife, or an injury to himself through the dishonor of his wife. People presume too much on their right to kill men for such causes.

The actual seduction of a wife is not nor should it be any excuse for murdering the seducer or the wife, as that would not undo or atone for the wrong, and it would release the husband or entitle him to a separation from his wife forever after. But when, as in this case, and as is so often the case, it is mere jealousy, founded perhaps on "trifles light as air," but which "to the jealous are confirmation strong as proofs of holy writ," we have a still stronger reason for not encouraging by word or act this widespread belief that a man may lawfully kill or that he is morally justified in killing one whom he suspects of improper intimacy with his wife, or simply of such intentions. They should not be encouraged to rely upon jurors violating their oaths to acquit them in such cases.

That a man is jealous even without cause is not ordinarily regarded as any evidence of insanity. If it was, extensively as jealousy prevails, we should have more insane persons on hand than we could provide for, and if a jealous man who doesn't commit actual crime is not to be treated as an insane man, a jealous man

who does commit a crime should no more be considered insane for that reason, but should be dealt with for the crime committed precisely the same as if for other reasons, or actuated by other motives he committed crime. Unless we make the commission of a crime in itself evidence of insanity, we cannot, I think, make a case from the evidence before us that will warrant us in considering Mr. Rhinelander insane.

However, physicians or alienists who make this subject a study, are best qualified to judge in such cases; and it is, therefore, with great deference that I venture to differ with the author of the paper just read, and to arrive at an opposite conclusion from the same state of facts.

W. H. H. RUSSELL, ESQ.: I must beg to differ with the author of the paper for several reasons:

1st. Because the case presented shows no hereditary taints.

2d. Because there is no loss of memory.

3d. Because there is perfect coherency of thought. No person, I claim, can be pronounced insane who enjoys a good memory and perfect coherency of thought. The habit of masturbation while at school, unless continued and practised after manhood, would not indicate or produce insanity; and as to the quarrels with the wife, that surely is not an element, for most married men have their family peccadillos.

This illustration reminds me of the anecdote I frequently told during the late canvass in Connecticut, when referring to the tariff and the protection theory of the Monopolists, as to the working classes. Pat and Bridget were raised up children together, as neighbors, and they grew to manhood and womanhood, as they supposed loving each other; they married and got on happily for several years, when they discerned an incompatibility of temperament, and they frequently quarrelled. One evening, as they were sitting in front of the grate-fire, Pat reading the paper and Bridget sewing, Pat looked down at his feet, and seeing the dog quietly sleeping and the cat curled up on Bridget's dress, thought it was a good circumstance to remind Bridget of the example of the dog and cat, and he naturally exclaimed: "Look at that now, Bridget; there's the cat and dog at perfect peace and ease. Why can't we be like that?" Bridget, looking up in a spiteful manner, said: "You foolish spalpeen, don't you know that if that dog's tail was tied to the cat's ye'd have noise and fighting enough before morning." And so the ordinary features of married life are no criterion of one's sanity. And the walking about of the patient with his hands fumbling in his pants pockets

does not indicate anything remarkably strange, for most of you will remember the anecdote of one of the distinguished speakers in Congress who was always in the habit of speaking with his left hand in his left side pants pocket, and on one occasion when a bill was up before the House on debate for the relief of the widows and orphans of the soldiers of the Mexican war, the member speaking said: "Mr. Speaker, I hold in my hand a bill for the relief of the widows of that memorable struggle," and one of his opponents arose, and with great dignity said: "Mr. Speaker, may I ask the gentleman in which hand?" The relatives of Mr. Rhinelander were doubtless actuated by good motives in the late proceedings, because they wished to save the family name from being tainted by the dark stain of felony. They knew that to be convicted of a felony was far worse than to have a member pronounced insane as to a particular act.

Mr. R. had some reason to believe that there was a conspiracy to defeat him of his rights. Drake was the advising counsel of the father, and the annuity had been reduced, to R.'s great discomfort; besides, he believed that Drake was alienating the affections of the wife. It was no delusion for him to have thought so. . . . In conclusion, Mr. President, I fail to find in the case presented in the paper the essential elements of insanity.

Upon the witness stand Rhinelander displayed coherency of thought and a remarkable memory. His idiosyncrasies are no in dications of insanity. It is a well known fact that Napoleon, Luther, and Johnson had distinct and fixed hallucinations, but no one would pretend to say they were insane. . . . I must agree with the learned Judge in his able opinion in the case. R. may not have a well balanced and healthy brain, but that does not make him insane. And when I use the word *insane*, I mean an incurably diseased brain, necessarily impairing the intellectual faculties. In the absence of hereditary taints, and with good memory and coherence of thought, I do not agree with Dr. Hardy.

WILLIAM EDWIN OSBORN: Mr. President, being a comparatively new member, and this being the first meeting of your Society I have attended, I naturally shrink from seeming to obtrude myself upon your attention, especially in any attempt to discuss a subject (the Rhinelander case) of which, I frankly confess, I know nothing aside from what I have learned from the very interesting paper of Dr. Hardy just read; but since an eminent medical gentleman present, upon being asked to speak, has declined to do so until others had spoken, my only motive in saying any-

thing is, in some measure, to provoke a discussion in which he has promised to join.

The study of insanity has always seemed to me to be as perplexing and difficult as it is sad and interesting.

As there are no two minds *exactly alike*, it has always seemed to me to follow that there can be no two insane persons exactly alike in their insanity; difference in temperament, in mental development, in disposition, as well as disease and habits of life, all come in to modify the freaks and eccentricities of the insane.

We sometimes hear of persons, exemplary in life, regular in their habits, to all appearance—even under the discerning eye of the physician—healthy in body and in mind, developing later on in life a growing and increasing mental disorder, which terminates in death in some lunatic asylum. In some of such cases, I believe, it has been discovered that such mental disorder originated in some hidden deformity or germ of disease which had been transmitted by inheritance from some ancestor.

There are cases where consumption, transmitted by inheritance to the children of consumptive parents, has from some unknown cause been diverted from the lungs, the usual seat of the disease, to the brain, in which, by slow but sure advances, mental imbecility has taken the place of intellectual brilliancy and power, a gross the place of a sensitive and refined nature, and envy, ingratitude, and positive unkindness bordering on to, if not amounting to, cruelty, especially towards their most fervent friends, unseat a once beautiful, mild, and amiable character.

One of the first law cases I ever had was before a commission in lunacy in this city, and afterwards before a referee in Brooklyn, in a proceeding having for its object the compelling of the committee of the alleged lunatic to perform a contract made by him before he was judicially declared insane; and when I reflect upon the diversity of the causes of insanity, whether inherited or contracted in life, to say nothing of the diversity of causes contributing to or tending to modify the insane condition, I am forcibly reminded of the statement of a medical witness in that proceeding, who, when asked how many classes of insanity there were, answered "*as many as there are insane persons.*"

In that case the eccentricities which were urged as evidences of insanity were such as, to the same degree, he had had all his life, and never more strongly marked than during a period of successful business management, in which he amassed a fortune and established a valuable business, the simple good-will of which was said to be worth twenty thousand dollars, and which business, under

the management of his successors, became valueless. This man at last died in a lunatic asylum.

Dr. Hardy, in his interesting paper, calls attention to the fact that Rhinelander, up to a very recent period, was addicted to self-abuse. Whether this had caused or contributed to his mental condition or not, it certainly cannot be doubted but that that vice, habitually indulged, tends to moral and mental weakness and imbecility ; in fact, anything that impairs the nervous system, whatever it may be, must to some extent and in some way injuriously affect the mind even if it do not produce insanity.

Mr. President, I realize that I have said nothing new or interesting ; my only excuse for saying anything being, as I have already stated, to draw out a discussion, in which I may learn more upon the subject of this paper.

S. B. LIVINGSTON: Mr. Chairman and Gentlemen, I cannot agree with my legal brethren in their conclusions upon this paper. We are discussing, as I understand it, the validity of the writer's conclusions upon the evidence furnished by the paper.

Gentlemen have reached an opposite conclusion to the writer by an analysis of the evidence in detail, which demonstrates that no particular piece of evidence is conclusive of Rhinelander's insanity. But a perfectly irresistible conclusion may be deduced from an accumulation of evidences, every single one of which is inconclusive. The evidence must, I think, be weighed in the light of the crime. Rhinelander attempted to kill Drake. The reasons which prompted him to make the attack as given by himself are that he suspected that Drake was trying to betray his wife. He found two empty chairs that had been occupied by Drake and his wife in close proximity in Drake's office and a glass upon the table which smelt of whiskey.

Upon this evidence (*sic*) he concluded that Drake had sought to betray his wife, and it was satisfactory enough to his mind to lead him to attempt Drake's life. This, if true, is strong evidence that Rhinelander's reasoning power was so far below the average as to lead to a strong suspicion that he might be insane.

Throughout the trial he held to his opinion, and sustained it with some degree of skill. This suspicion of insanity grows into a conviction when the case is more fully developed. His whole life has been abnormal in contrast and in conflict with his immediate environment, and varies so far from normal standards as to place him in the ranks of persons of questionable sanity. The physical indications point to the same conclusion.

The crime and the strange reasoning which in his mind justifies

it the light of the other evidence is the crime and the reasoning of an insane mind. He could not have been convicted had he availed himself of insanity in his own behalf to save his life. The plea of insanity being, however, forced upon him, possibly to shut out any defense upon the merits which he may have, loses its force, which, however natural, should not be permitted to obscure the judgment.

DR. SPITZKA: I have listened to the paper with a great deal of interest, and although absent from the room during the remarks of the last speakers have heard sufficient to inform me of the general drift of the discussion. As regards the paper itself, I consider it as an able and dispassionate statement. I should have wished that Dr. Hardy had followed out more consecutively the facts, as they stood in Rhinelander's mind, and therefrom developed the events which culminated in the attempted assassination. With the facts before me, as presented by Dr. Hardy, I will not hesitate to say that every competent alienist must recognize the subject of the sketch to have been insane; the form of insanity being monomania, or as the Germans call it, "Verrücktheit;" indeed I have grounds, that have come to my knowledge through private channels, for saying that it is a case of "original monomania," inasmuch as the peculiarities of movement, which were correctly associated with his mental condition, are present in the father and eldest son of the prisoner: that is in three generations. I say all this on the assumption that the facts related by Dr. Hardy were proven, and I have sufficient confidence in him to say that I have no doubt his own findings were exactly as he represents them tonight. I saw the prisoner on the witness-stand; his exhibition was certainly one of the most fluent, adroit, and oratorical I have witnessed. His language was well selected, he manifested traces of an education far superior to that of several of the medical politicians with whom it was Dr. Hardy's misfortune to be associated, as well as of one at least of them who were opposed to him. He showed a keen appreciation of his position, felt the pulse of the public well, and came out with witty declarations calling for sympathy and applause in the court room at the right moment. But all this is not inconsistent with insanity. I feel quite confident, now, that a properly directed cross-examination would have exhibited more clearly to the public a certain silliness underlying this superficial show of reasoning power. The quickness, volubility, and excellent memory of Rhinelander can be duplicated in the wards of most asylums, and in face of the facts of Dr. Hardy's paper, as well as the event which led to Rhinelander's arrest and

trial, it would be difficult to deny that he is quite as dangerous a lunatic as any there confined.

I do not believe that the prisoner is necessarily suffering from general paresis. I remember that Dr. Folsom, an eminent American alienist who agreed with me as to the insanity of Guiteau, expressed a suspicion, which the post-mortem seemed to verify, that Guiteau, while suffering from original monomania, was possibly developing the initial symptoms of paretic dementia. But physical signs resembling those of paretic dementia are found in congenital and inherited monomania; they differ somewhat in character. I believe it is these which Rhinelander manifests, and not the genuine indications of organic brain disease.

I do not believe Recorder Smythe is to be censured for finding as he did. Whatever the scientific merits of the case, it was presented to him in a very unfortunate way. One of the commissioners exhibited his prejudices with an ostentation, which led to just and severe condemnation by public opinion. The experts who were most unpleasantly prominent in the case, on the same side with Dr. Hardy, presented the demeanor in the court room rather of two detectives attempting to effect a certain purpose than of scientific witnesses dissecting and presenting a case. Their statements on the witness stand deservedly met with general ridicule, and I must agree with Recorder Smythe where he says that it was not likely that Rhinelander suffered from seven different forms of insanity—several of them incompatible with each other—at one and the same moment. The chief reason for the miscarriage of the Rhinelander case—for on the strength of the presentment to-night I think it may be pronounced a miscarriage—lay in the fact that the principal medical instruments of counsel for the family had themselves heaped ridicule on the science which they found it convenient to espouse on an occasion where the money-bags and scientific truth happened to lie on the same side. The money-bags and scientific truth lay on opposite sides in the Guiteau trial, where these men also testified. Whether it is due to this fact or no, at all events it is a sinister coincidence, that in the Rhinelander case they laid great stress on the appearance and motions of Rhinelander, and denied in the Guiteau trial that the same signs were of any importance; in the Rhinelander case they denied that volubility, good memory and skill in repartee were inconsistent with insanity, while in the Guiteau case they made this denial. While agreeing—as I take some gratification in doing—with Doctor Hardy's conclusions to-night, I cannot suppress the reflection that if he had not been hampered by such

associates, if the counsel of the family had been contented with one good instrument, insted of accumulating a lot of bad tools that had been too often prostituted to unworthy ends in the past, the end might have been different.

A vote of thanks was then given to Dr. Hardy for his able paper.

Nominations for officers for the ensuing year being next in order, the following were made: For President, Dr. Frank H. Hamilton, Dr. Stephen Smith, Hon. Wm. Barnes (declined), Hon. Amos G. Hull (declined), Dr. E. C. Spitzka (declined); for Vice-President, Hon. Amos G. Hull; for Secretary, Dr. Geo. W. Wells; for Treasurer, Dr. E. C. Harwood (declined), Dr. J. H. Fruitnight (declined), S. B. Livingston, Esq. (declined), Dr. A. M. Jacobus; for Financial Secretary, Max F. Eller, Esq.; for Corresponding Secretary, Dr. E. C. Spitzka (declined), Dr. J. F. Chauveau; for Trustees, Dr. Wm. L. Hardy, Dr. N. E. Brill, C. H. Kitchell, Esq., W. H. H. Russell, Esq., Dr. J. H. Fruitnight, H. W. Sackett, Esq., Dr. W. M. McLaury, Dr. C. A. Leale, Dr. Guido Furman (declined), E. H. Benn, Esq. (declined), Dr. E. C Spitzka (declined), D. M. Shaw, Esq., Hon. Wm. Barnes, Esq., Dr. C. S. Wood (declined), S. B. Livingston Esq., (declined), C. W. Moulton, Esq., W. E. Osborn, Esq. (declined), Dr. J. L. Corning, Dr. H. J. Boldt, Dr. R. Newman.

It was moved and seconded that the resignation of Dr. Brown, which was read, be accepted. Carried.

It was moved, seconded, and carried that the Secretary add to the notices of the next meeting the clause that "every member is earnestly requested to attend."

The paper for the December meeting was then announced to be read by Judge Amos G. Hull on the "Evidence of Experts."

The Society, on motion, then adjourned.

Twentieth Regular Meeting.

The twentieth regular meeting of this Society was held at the usual time and place on December 11th, 1884, the President, the Hon. Wm. Barnes, in the chair. The minutes of the preceding meeting having been approved as read, the Trustees reported that the next meeting of the Board would take place at 214 East Fifty-third Street, on December 29th, 1884, at 8 P.M., and recommended for election to active membership Dr. Wm. J. Purcel, 359 West Fifty-eighth Street. The election of Dr. Purcel resulted unanimously, fifteen votes being cast; Mr. Sackett and Dr. Jacobus acting as tellers.

The Society then, after its reading of Dr. Smith's declination of the nomination for President, proceeded to elect its officers for the ensuing year, and the tellers having counted the ballots cast announced the following result:

President, Dr. Frank H. Hamilton.

Vice-President, Hon. Amos G. Hull.

Secretary, Dr. G. W. Wells.

Treasurer, Dr. A. M. Jacobus.

Financial Secretary, Max F. Eller, Esq.

Corresponding Secretary, Dr. J. F. Chauveau.

Trustees, Dr. Wm. L. Hardy, Dr. N. E. Brill, Dr. J. H. Fruitnight, Dr. W. M. McLaury, Hon. Wm. Barnes, W. H. H. Russell, Esq., D. M. Shaw, Esq., C. H. Kitchell, Esq., H. W. Sackett, Esq.

Dr. Spitzka then presented for inspection a volume of Paulus Zacchias, and made the following remarks, which, on motion, were ordered to be entered on the minutes:

IN MEMORIAM PAULUS ZACCHIAS.

IT is three hundred years ago that there was born in Italy a man who was destined to become the founder of modern medical jurisprudence. The date of his birth, beyond the mere mention of the year, 1584, is unknown, and it is therefore proper, as the third centennial anniversary of his birth is drawing to a close, to recall the debt we owe to PAULUS ZACCHIAS.

I believe few founders of sciences equally important with medical jurisprudence are as comparatively unknown as this great man. As a biographer[1] states, no reader of the better class of comprehensive medico-legal treatises but is occasionally struck by the mention of the name of Zacchias. Few, however, identify him, most regard him as possibly an industrious pamphleteer. Not a year ago, an accomplished reviewer of a little treatise on insanity took its author to task for citing Zacchias, without informing the reader where the citation was to be found; thus showing how vague is the popular knowledge of one whose name is identified with one, and but one, medico-legal work—yet that one, perhaps, the greatest monument of individual compilation and research made in this field. I hold in my hand, and pass around among you, this ponderous folio tome, bound in the traditional hog-skin of the period, and entitled QUESTIONES MEDICO-LEGALES. It

[1] Many of the facts here stated were obtained from an article by DR. KERSCHENSTEINER, editor of Friedreich's Blätter für Gerichtliche Medizin, 1884, part iii., to whom the author is indebted for them.

includes in reality three volumes, of an aggregate of over fifteen hundred pages, in double column and fine print Latin, remarkable, as a better connoisseur than myself has said, at once for its simplicity, accuracy, and elegance. These embody thousands and thousands of cases, and references; are replete in every paragraph with original comments and illustrations, drawn from a rich and well-registered experience, and cover every possible medico-legal question that might be put at the present day. The index to this work is no mean volume in itself, and might not inaptly be called a dictionary of medical jurisprudence.

Zacchias was not a mere book-worm and collector of what had been done before him. He was an accomplished practical physician and Proto-medicus, that is, chief physician to the Pope. As such he was the medical adjunct of the highest ecclesiastical court. His was known as the *Rota*, probably because the tiles of the floor of the historical court were arranged in the shape of wheel spokes. Before this tribunal were brought all unusually difficult or doubtful questions, and during the many years that he sat in its chambers, Zacchias gained an experience, not only as a medical adviser, but also as a legal analyst and a judicial critic, such as probably no other member of our profession will have an opportunity of acquiring. Nor was he a one-sided medical jurist, taking an interest only in the abstruse details of the subject to which his great work was devoted. He is known as the author of several poems of great merit, and was an accomplished student of history and belles-lettres.

I could detail many interesting features of the work before you, had I the time. It is in many respects a connecting link between the medical jurisprudence of the Romans and that of modern codes of law. In some respects, it is in remarkable accord with the most advanced

teachings of to-day, and the chapter on "Survivorship" is one that could scarcely be improved by writers commanding the additional experience and study of the two and a half centuries which have since elapsed. As a work of reference, it occupies the very highest position in all fields which it enters.

That with these numerous excellences, a work which was written at the dawn of the period which followed the dark age of science, should share the imperfections of the time in which it was written, is but natural. When English judges wrote treatises to prove the existence of witches, and judicial decisions teemed with reasoning which would be repudiated by a pupil in the public schools of this day, we can find no cause for censure of Zacchias because he gravely argued that minors were proper subjects to be put to torture. And when we recollect that in an earlier edition of an American medical jurisprudence, language is contained which suggests that the authors of that treatise admitted the possibility of demoniacal possession, it strikes us that Zacchias cannot be reproached for devoting whole paragraphs to this subject. He was certainly one of the best thinkers of his day, and the picture extant of him, a copy of which I am also able to exhibit, suggests that he must have been the possessor of a dispassionate and profound mind. His services to medical jurisprudence may be summed up as consisting, first, in the collection of a vast material of precedents and medico-legal data, which but for him might have been scattered and lost in the enumeration of the chief decisions of the important court—at that time the highest in Christendom—of which he was a member, in mediating the application of the Roman Law to medical jurisprudence, in consonance with advancing medical science, and, above all, in establishing a juster criterion of legal irresponsibility in the case of lunatics than those in use before his

day. In view of these, his shining merits, it has seemed proper that the only society devoted to scientific medical jurisprudence in this metropolis should not close the year which is the three-hundredth anniversary of the birth of Zacchias, without at least a mention of the founder of that modern science which it aims to advance.

The paper of the evening, entitled the "Evidence of Experts," was then read by the Hon. Amos G. Hull, and the discussion which followed was participated in by Dr. Corning, Dr. Wight, Hon. J. F. Miller, Mr. Kitchell, Dr. Spitzka, Mr. Russell, and Dr. Jacobus.

EXPERT EVIDENCE.

BY

AMOS G. HULL

WHOEVER enters this realm of science, steps into a domain wide enough to engage the profound attention of thoughtful men, and as broad and extensive in its aims as the student of any branch of jurisprudence may be required to survey or explore. The paper of an hour can hardly be expected to furnish the key to unlock the vestibule which opens on that domain.

Volumes have been written on this inexhaustible theme; more remains to be written than has ever yet been said. The life of a human being frequently hangs on the attenuated thread of the mere opinion of an expert. Liberty, property, and reputation often quiver on that side of the balance which even the breath of an expert may cause to kick the beam. Why do judges and juries and counsellors bow with deference to the opinions of experts?

It is because they are supposed to have ascended those hills of thought and knowledge which jurists have not found time to climb, and have brought down the fruits of their learning and research to enrich jurisprudence and benefit mankind in ten thousand ways. Very few important trials are had either in civil or criminal proceedings in which expert evidence is not required for the due and intelligent administration of justice.

Patent cases, on the result of which hang vast fortunes, are never tried without the benefit of expert evidence

Indeed, expert evidence is required in the administration of every branch of civil or criminal jurisprudence.

Society in some form demands the genius and skill of experts both in science and in art. This demand must be honestly and intelligently supplied. "In the best days of the Roman State, they were called Juris Consults; to them the Prætor resorted for aid in the composition of his annual edict, the private citizen for advice, the principal officers of State, as well as the Emperors themselves, for guidance in the discharge of their legislative and executive duties."

The best days of the jurisprudence of Rome from the birth of Cicero to the reign of Alexander Serverus is full of illustrious names whose lives were devoted to the task of developing the science of jurisprudence.

It was expert evidence that rescued the reputation and memory of the late Dr. Eliphalet Nott, of Union College, from unjust aspersions and undeserved obloquy. He had been, as is well known, the popular president of the college for more than fifty years. He had educated such men as Gov. Seward, John C. Spencer, William Kent, Judge Danforth, Clarkson N. Potter, and hundreds of the best young men of his time. He had been the patentee of many useful patents. He had speculated in lands on Long Island and in New York, and in the course of his Presidency vast sums of money had passed through his hands.

When age began to disqualify him for the active duties of life, his business affairs fell into the hands of others.

They became complicated. Being an aggressive man, he had in the course of a busy life made enemies.

All gifted leading men make enemies.

His enemies, availing themselves of their knowledge of some trifling entanglements in his accounts, started a

private ex parte investigation of the affairs of the college for a period running back nearly fifty years.

This ex parte committee heralded to the world that the doctor was a defaulter to the amount of hundreds of thousands of dollars. The report filled the hearts of many of the alumni with grief and sorrow.

An alumnus, one of the doctor's favorite students, Hon. John C. Spencer, although advanced in years, rebelling against what he deemed an injustice to the doctor, procured the services of a number of honest expert accountants.

They went through the books and financial affairs of the president during the whole period of his official term; and not only vindicated the president, but showed that the college was in debt to him in the sum of over five hundred thousand dollars. Here not only was justice done financially by the aid of expert evidence, but the reputation of a great man was relieved from a load of calumny.

Pardon a few more illustrations of the value of expert evidence, for I have a profound respect for experts when they are learned and honest.

Take the Parkman case. The doctor was last seen when alive to enter one of the departments of Harvard College. He was well known. His disappearance created a profound sensation throughout Cambridge and Boston. The belief was strong in the public mind that he was somewhere within the walls of the college. The most careful search at first revealed nothing. While the search was progressing, one morning a placard appeared on the Charlestown Bridge containing a notice to the public that the body would be found in Charlestown River. The notice was written in a hand evidently disguised, and with a blunt, rough instrument which afterward proved to be a stick of nearly half an inch in diameter, the end of which

had been dipped in some inky substance and then applied to the coarse paper used for the placard.

Search was made in the rooms of the college professors to get specimens of their handwriting. Among others the handwriting of Prof. Webster was found.

An eminent expert in chirography was shown the hand-bill and the professor's handwriting. After a careful examination he pronounced the handbill to have been written by Prof. Webster. That led to a further seach of everything connected with his apartments at the college. The fragment of a jawbone was found in the ashes in the doctor's fire-place. This was placed in the hands of an eminent expert surgeon who was also a dentist.

He found the jawbone to fit a cast which he had made for Dr. Parkman for artificial teeth. These two experts, with the aid of some other corroborative circumstances, furnished the clue by which the identity of the homicide was discovered. Dr. Webster, after a fair and impartial trial conducted with great ability on behalf of the people, and with equal skill for the defence, was convicted on purely circumstantial evidence and sentenced to be hung. This great crime might have remained a mystery to this day had it not been for the intelligent skill of those experts.

As will be remembered, Prof. Webster made a frank confession of his crime before his execution.

I ask pardon for digressing for a moment to say that if the present law in this State, giving the defendant the right to be sworn in his own behalf, had existed at the time in Massachusetts, Webster would only have been convicted of manslaughter. There was no malice in the case. Parkman had insulted and then assaulted him. Webster struck the doctor with a piece of a grape-vine. The doctor fell. The blow happened to be on a tender

and vital part. He died almost instantly. Instead of rushing out and calling for help, some spirit of evil entered the professor's heart and he sought to conceal the evidence of his deed. That concealment cost him his life, and his excellent family lives of sorrow.

His statement of the transaction after his conviction was candid, and evidently truthful; he should have been imprisoned and *not* hung.

The law books are so full of cases where justice has been done and the rights of parties protected through the instrumentality of expert testimony, and the cases are so familiar to you all that I forbear to enlarge on this branch of my paper.

But a clamor has been raised against all kinds of expert testimony. That clamor cannot be ignored. Its voice is deep and affects the laity. It reaches lawyers, jurors, and more or less the bench. It affects seriously the administration of justice. The cry is that expert testimony is unreliable, purchaseable, corrupt. The charge (lamentibile dictu) is directed at present principally against medical experts. Is there any just reason for this charge? There never was a time within human history when medical science stood so high in the estimation of the world as it does this day. More particularly those branches of the science which relate to toxicology, surgery, mental alienation or insanity. The light of modern science has shone with marked effect on those three branches of medical research. Surgery and mental alienation particularly.

The last sixty years have been full of marvels of discovery in those branches of medicine. Why! The very best light of Grecian or Roman science on surgery or insanity would be as inferior by comparison to the light of modern knowledge on those subjects, as would be the dim and smoky flame emitted from the end of a tow-string coiled in a pint of oil in the bottom of an old rusty Roman

skillet, if placed by the side of the effulgent blaze of the electric lights which now begin to illumine two hemispheres. In the midst of all this light and knowledge the question recurs, Is there any just cause for complaint against experts?

I answer that there is cause for complaint. It arises from causes in which members of the legal, as well as members of the medical profession, are in fault.

1st. Members of the bar in conspicuous cases have placed unscrupulous medical witnesses on the stand as experts.

2d. They have used so-called experts as detectives.

3d. Medical gentlemen who have held themselves out as experts, when on the stand as witnesses, have failed to show that candor, impartiality, intelligence, skill, frankness, truthfulness, learning, and ability which the public have the right to expect from him who claims the high privilege of enlightening and instructing the court and jury. The duty of the expert is very much like that of the juror.

His belief, his opinion, his conclusions, his judgment, upon a given state of facts, he may give.

The province of the jury is to do nothing more than to form and declare conclusions. The *verdict* of a jury consists of nothing else but the judgment of twelve men formed upon a given state of facts.

That conclusion or verdict is given merely to aid the court in giving final judgment. By reason of the superior knowledge and learning of the judge, the verdict of the jury in *civil* cases may be set aside by the court, should it be manifestly against the evidence. It may be set aside for a multitude of other reasons. Now suppose an honest and learned expert is called to aid the jury and the court in moulding and forming the verdict and judgment. In such a case, the court has an additional element on which to repose in giving final judgment.

I shall confine the remainder of my remarks on this theme to a consideration of expert evidence in its relation to cases of negligence resulting in injury to the person—cases of malpractice and criminal cases. Many a poor fellow has lost his reputation, his property and often his liberty, by the unskilled, or careless and sometimes purchased opinion of an expert, or by the ignorance of his counsel or the court who failed to detect the folly or wickedness of the expert's testimony. Honest, truthful, sincere, and learned doctors, who are liable to be called as experts, suffer from the clamor now raised against experts generally in the same manner that upright and honest lawyers suffer in reputation by reason of the conduct of shysters and pettifoggers. Let us see whether the public have any reason to complain. Within a short time, a case was tried in this city against the Hudson River Railway, in behalf of an aged lady, for a severe injury to her person by being run over by a drunken, reckless driver of a freight wagon belonging to the defendant. The plaintiff's head had been so injured as to cause almost permanent deafness. One of the so-called experts of that company was placed on the stand. I quote his language from the printed case as used in the Court of Appeals. He testified: "The defendant requetsed me to go there to see how much the plaintiff was injured." Question—"Did you examine her ears?" Answer—"I did not. There was nothing said about her ears." In a few minutes thereafter, in answer to another question by the defendant's counsel, he testified: "I saw her right ear, that she said had been inflamed in former years." Question—"Did she make any statement to you as to how the accident happened; what did she say with respect to her looking before going into the street, if anything?" Answer—"She said she went past up the avenue and she did not look either way, that she went up the street and was knocked

down, and she did not know by what." He further testified on his cross-examination that he had been called by quite a number of other railroad companies, quite a number of times. He further testified as follows: "I am appointed by the various justices of the courts, and I preside as a Commissioner of Lunacy." When pressed to know whether that was not his principal business, he claimed not, that his general practice was large, that he had made a large number of professional calls that morning. But it so happened that the loving daughter of this old lady was present, and heard the conversation between the expert and her mother, and testified that nothing of the kind was said. The jury had no difficulty in finding a fair verdict for the plaintiff.

This illustrates the danger of experts taking the position of detectives.

I witnessed another case brought by a gentleman who fractured his leg by attempting to enter one of the Bleecker street cars. As he was about getting on the platform, there was a sudden jerk or motion of the car which nearly threw the plaintiff down. It resulted in a transverse fracture of the tibia and fibula of one of his legs, without any external violence. He was treated by an eminent surgeon and was out in about forty days. He sued the company for negligence. Before trial the counsel of the company and this same expert appeared and desired to examine the injured leg. The leg was examined, from which it appeared that the union of the bones had left a protuberance or ring around the part of union, which was not only perceptible to the touch, but visible to the eye.

The surgeon who treated the fracture described his treatment with all the particulars to the jury, which was conceded by the defendant's counsel to be in all respects correct. The same expert above referred to went on to

the stand, and swore that he did not believe that there had been any fracture. He swore that the contraction of the muscles never produced a fracture. On being asked whether he was familiar with the writings of that eminent surgeon, Dr. Frank H. Hamilton, and whether he considered him good authority, he replied that he was pretty fair authority on fractures of the patella or knee-pan.

He claimed to be familiar with the names of many eminent writers on surgery, and when asked if it was not authenticated by an eminent author with whose writings he claimed to be familiar, that a femur had been fractured by muscular contraction in an unsuccessful effort to kick a person, he answered that there was no such case; and when asked whether an eminent writer had not cited a case where a colored preacher had fractured his arm from muscular contraction by violent gesticulation in the pulpit, he answered that there was no such case, and that muscular contraction never produced a fracture. The counsel for the plaintiff produced no less than four volumes by different authors of the very highest authority holding that fractures are frequently produced by muscular contraction, and the expert claimed that those authors had escaped his attention. Take the celebrated Gosling case. Two physicians, who were called experts, testified that Gosling was sane. One of them had written a letter to his friends in Europe, tending to show the unsafe condition of the patient, a short time before. Other physicians testified that Gosling was suffering from general paresis of the insane, and gave their opinion that he would die of that disease. Here were two learned, candid, impartial witnesses against two so-called experts. The so-called experts won the case. Gosling was pronounced sane. Shortly after the lunatic confessed a judgment to his attorney for $8,000. He had married a woman of bad repute, who was interested in concealing

his whereabouts from his father and mother and brothers and sisters. He was finally sent to a lunatic asylum. I shall never forget the rebuke which the reader of a paper on the subject administered to the experts, whom the doctor had invited to hear, which he had prepared on the case; deeming it to be a great outrage that doctors could differ on the diagnosis of a case that was so very plain. I remember with what indignation he said in the presence of the experts who had pronounced Gosling entirely sane as against his own diagnosis and opinion, and that of another medical expert of still more distinguished attainments:

"If Gosling is not suffering from paresis, if he is not incurably insane, if he does not die insane within five years, I will burn up my library and abandon my profession." Poor Gosling, the victim of harlots and others as bad, died within the five years on the 19th day of January, 1884, at the Amityville Poor House Asylum.

In the Rhinelander case the experts who tried to make out his insanity, swore to five different forms of insanity. The Recorder very wisely and sensibly decided that such evidence was unreliable, because a person could not be in two different stages of one and the same disease, at one and the same moment. In the Guiteau case fourteen medical witnesses swore regarding the prisoner's state of mind. One testified that there was no hereditary disease whatever. That no disease is ever transmitted. Another swore that ill-balanced and odd people are less likely to become insane than well-balanced people; another that one in every five persons is insane. One witness swore that there was no such term as moral insanity in science; but to prove it introduced the same term in his book soon thereafter published. Dr. Gray denied that insanity was ever transmitted hereditarily, and was then confronted

with statistics of his own asylum prepared by himself and headed, "Hereditary transmission."

For much of the clamor against medical expert testimony the legal profession is at fault.

Lawyers frequently are too ignorant to examine medical witnesses. They often cast medical science aside as a matter that does not concern them. The distinguished David Paul Brown once said: "A doctor who knows nothing of law and a lawyer who knows nothing of medicine are deficient in essential requisites of their professions."

The cause for this want of training on the part of many lawyers at the present day dates back more than twenty-five years.

But the matter to deplore connected with the profession is not so much the fault of the lawyers, as it is one of the calamities of bad legislation.

Prior to the year 1846, before a student could be permitted to practise as a lawyer, a clerkship in a law office of seven years, after the age of fourteen, was required; but four years of classical study was allowed as a part of the seven, and then, after being admitted as an attorney, he was not permitted to try causes at the Circuit or argue causes in the Supreme Court or before the Courts of Equity, until he had practised three years.

At the expiration of that time he must undergo another examination before he could take the degree of counsellor. In 1846 there assembled at Albany a convention of men to revise the State constitution. That convention had among its members some able men. It had others who were mere demagogues. That convention undertook the task of "making every man his own lawyer." Knowing that I am entering upon a delicate subject, I shall proceed with care and give authority. I now cite the language of Attorney-General Tremain, from an address delivered by him before the graduating class of

the Albany Law School, in May, 1876. After quoting the language of that constitution, which declares that any male citizen of the age of twenty-one years, of good moral character, and who possesses the requisite qualifications of learning and ability, shall be entitled to admission to practise in all the courts of this State, he adds: "This provision the convention, after several refusals, was induced to adopt, at the solicitation of an aged member of the convention who had spent his life as a practitioner in courts of Justices of the Peace, but had been unable to obtain admission to the bar."

But it may be said that I impeach the intelligence of the people in voting for such a constitution. I answer, The people are sometimes deceived by their leaders. In this case it was lamentably so. Members of Assembly had heretofore been (as they always ought to be) elected by counties. The partisans in the minority knew that in those counties where the party in power had large majorities they could carve out of some little nook or corner a district, and elect their candidate. They prepared an article to elect members of Assembly by districts. That was placed in the instrument as an offset for some other piece of folly on the other side. And when the document was submitted for ratification by the people, the politicians and political papers on both sides advocated its adoption. Lamentable to be said, it was adopted. It was that constitution which has so often filled the Legislature with so many weak, illiterate, and corrupt men—men who passed laws the effect of which tended to degrade the legal profession. It was that unfortunate instrument that made it possible for such large numbers of uneducated and unthinking young men to enter a profession which should have, to a certain extent, within its sphere of learning all the vast fields of human knowledge.

As Judge Tremain aptly expresses it, "That opened

the Pandora box." Scores of uneducated men, young and old, rushed for admission to practise law. The profession became crowded, and borne down by the weight of what are called in the cities "Shysters," in the country "Pettifoggers." By an amendment to the Constitution in 1870, we have corrected this abuse, and the shysters hereafter will be kept out. But another generation must pass away before we shall be rid of all the evils of that most deplorable constitution. But the profession is on a better tack. Brighter skies are overhead.

But to remedy the evils of spurious expert testimony, ex-Judge Calvin has proposed a bill, which I understand is to be presented to the Legislature, two sections of which are as follows:

AN ACT TO PROVIDE FOR THE DESIGNATION OF MEDICAL EXPERTS—AND THEIR ATTENDANCE AND EXAMINATION AS WITNESSES IN CERTAIN TRIALS AND PROCEEDINGS.

The people of the State of New York, represented in Senate and Assembly, do enact as follows:

SECTION 1. The several Justices of the Supreme Court of the State, composing the several General Terms of said Court, shall meet at some place to be designated by the respective Presiding Justices thereof within their respective departments on the first Tuesday of July, which shall be in the year 1884—and every two years thereafter—and shall, with the advice of such medical societies or authorities as they may deem useful, designate medical experts for and residing in their Judical Department, and distributed as equally as practicable over the same, who shall be learned and experienced in, and possessed of special knowledge of mental diseases, and who shall have had an active practice therein of at least —— years, to be denominated and known as the Medical Experts for said Department for the next two succeeding years and until their successors shall be designated in the manner above prescribed.

SEC. 2. In the trial of all actions, special proceedings, complaints or indictments, after the designation provided for by the foregoing section shall have been made, in which a question of mental

capacity or soundness shall be involved, or may arise, and in which mental experts are intended to be called and examined, the counsel for the party so intending to produce such witnesses shall state to the Court such intention, and the number desired to be produced, whereupon the Court before which said trial is to be had shall, after hearing the respective parties, determine the number of such experts to be called therein, and designate by name from the number of the experts for such Judicial Department who may be called, and on the parties depositing with the Clerk of said Court the amount of fees prescribed by the Court to be paid to said experts by said Clerk on the direction of the Court, whereupon said experts may be procured to attend and give testimony as such upon the order of said Court, and no other mental experts shall be examined upon such trial.

Such a law would be impracticable, and should not be passed for the following reasons:

I.

The Legislature has no constitutional authority to pass any such law.

It would be creating a Department of Medical Experts as a part of the judicial machinery of the State, which has no warrant in the constitution. These medical experts would be to all intents and purposes public officers. The judges of the Supreme Court are expressly prohibited from exercising any power of appointment to public office. It is true the word "designate" is used in the proposed bill, but the word designate is only a synonym for the word appoint.

Vide—Constitution of the State of New York, Article 6, Section 8.

II.

Such a law would be repugnant to our bill of rights. In all criminal prosecutions the accused has a right to a speedy and public trial, by an impartial jury, and is entitled to be informed of the nature and cause of the accusation, to be confronted with the witness against him, and

to have compulsory process for obtaining witnessess in his favor.

SECTION 6.—Amendment to the Constitution of the United States.

1. R. S. 85, Edwards, Ed.

The accused has the right to select his own witnesses. He has the right to compel their attendance in Court, no matter how poor he may be. The proposed act would deprive him of that right. The Court would have determined beforehand the witnesses which he might call. It is a monstrous proposition. It is not only repugnant to our sense of right, but to our fundamental law.

III.

The crucible in which to test the value of expert testimony is "*Cross-Examination.*" We want nothing better. We can have nothing better. We cannot prevent bad men, whether laymen or experts, from going on the stand as witnesses. The Legislature has not the power to do that; Courts have not the power to do that. But an honest, learned, and skilful cross-examination can drive such witnesses off the stand in confusion and disgrace.

As the intelligence of the age advances, if the bench and the bar will keep step with the mighty strides which science is making in all the realms of thought, there is nothing to be feared from corrupt or dishonest witnesses, whether laymen or experts. Any honest witness possessing peculiar skill in the arts, or in science, or in business, or in the professions, whether he has obtained celebrity or not, who is placed upon the stand as a witness, and can undergo a learned and searching cross-examination without having his testimony shaken, is entitled to have that testimony weighed as evidence in the case. The examining counsel in the case is in duty bound to be an expert himself, or surround himself with experts, and if

they cannot strip off the hide of a charlatan, then no department of experts could possibly help the matter.

Whoever censures the theory of another, should be ready and willing to propose one which he deems to be better, hence I have taken the liberty to draft a proposed bill, which I respectfully submit for the consideration of the Society in case any legislation is to be had in the matter.

Proposed bill in respect to expert evidence:

SECTION 1. On the trial of all actions or indictments, and in all special proceedings, and in all contests relating to wills or codicils, it shall be competent for the court, judge or tribunal having the matter in charge, in its discretion, on its own motion or on motion of either party, to the issue or the contention, for good cause shown, to enter an order summoning such learned and distinguished experts as may be deemed necessary to aid the court or jury on the trial to attend as witnesses and give testimony.

SEC. 2. The expenses of the attendance of such experts shall be taxed by the court making the order and entered in the judgment of the prevailing party. In criminal cases, if the defendant is unable to pay such expenses, it shall be a charge on the county.

DR. WIGHT: Mr. President, permit me briefly to allude to two points suggested by the paper of Judge Hull. 1. In regard to the contemplated law for giving power to the medical societies and the Judges of the Supreme Court, to select and appoint medical experts for litigants, I must dissent. I am clearly of the opinion that such a law would be unconstitutional; and this point I believe to be so well taken, that any intelligent student of medicine or law could not fail to apprehend its nature and its bearing on the rights of individuals. The whole tendency of modern society and of recent legislation, is aggressive in so far as the rights of individuals are concerned. And the attempt to bring forward this law is illustrative of the perils that surround individual rights. Under the *constitution*, individuals have rights that other individuals, and corporations, and legislatures, are bound to respect. A blow successfully aimed at the constitution, undermines not only our civil, but also our religious liberties—and leaves us with our house built on the sand.

2. Now as to the expert in giving his testimony—if he has had experience, if he really has accurate knowledge, if he is versed in what he has to say, there is no attorney who can entangle him—no one who can make him contradict himself. Such an expert is the exponent of the truth, and the truth makes him clear, strong, and triumphant. And what is more—honest and upright attorneys like such a witness—yes, they respect and honor him, even though his words of truth contravene the evidence and pleadings of their case. Let me illustrate another kind of expert by an example or two: A small boy was run over by a truck and was injured to a limited extent. The owner of the truck was worth some $2,000,000. After many months, some surgical experts found that this boy had a stricture of the urethra. An attorney was engaged, and the value of the stricture was put at $30,000. The experts for the defendant were not permitted to examine this stricture—under an anæsthetic. And so they could not deny the existence of a stricture. The experts for the prosecution went into court—and made out a stricture of the *biggest kind*—they made one worth at least $30,000, and were sure of the result, for back of this was the round sum of two millions. Well, the experts for the defense did not deny the existence of a stricture, for they had no opportunity to enable them to do this. They did say on the witness stand, and illustrated their evidence by experience, that the plaintiff, if he had the stricture that had been proven against him, would be reposing under the benignant soil of Greenwood, instead of sitting for hours in court, and then going out,

and passing his water as well as any boy who had not been run over by a truck. And what is more, this case had not been treated for months—and then, so far as we could learn, the treatment had been insignificant.

Once on a time the hospital in which I practice surgery admitted a man, who had been crushed by an engine that fell on him, causing a severe compound fracture of the right thigh-bone, as well as other injuries. It was very doubtful if the man's life could be saved—and I made the remark that, if we could keep him alive long enough, he would bring an action for malpractice. We kept him alive, and he brought the action. And he engaged a medical man for expert, who was asked while on the witness stand—How many cases of compound fracture of the thigh-bone have you treated? And he was finally compelled to answer, that he had never treated one. Then came the question—Did you ever treat any case of such a fracture? At last he answered, that he had never treated a case of fracture of the femur.

In the first case—the jury did not believe a word of the experts in regard to the existence of a stricture. In the last case—the judge dismissed the case for want of evidence. In fine, the best thing for a witness to do is not to set himself up for an expert, when he has no experience.

DR. SPITZKA: I have repeatedly urged the superiority of the continental system in the abstract, but have come to recognize that we are either not ripe for it or must change our judicial system to adopt it and render it enactable. As long as we admit certain rights of the prisoner at the bar we must allow him the right of selecting his methods and materials for defense, and to limit him to what might possibly degenerate to a "ring" of court experts in his choice, would be an infraction of those rights. I think such an attempt would meet with the same rebuke as the one made under the inspiration of the Utica clique in 1874, when they succeeded in having an act passed excluding the issue of insanity from trials, and limiting the defendant to that issue before a preliminary commission, which that clique would have been able to control, as in the Dillon-Dilleber case. That act has been laughed out of court, as I think this project, so justly condemned by Judge Hull, ought to be. Why, think of it—if the courts were to select experts in insanity, say, whom would they select? Their family physicians and medical politicians; the same men, in short, who are appointed as our lunacy commissions and render them such a farce. No; bad as our system is, it possesses, in cross-examination, a better test of expert qualifications than the

individual preference of a judge, or the policy of medical cliques. In this country government patronage is usually asked for those who are unable to make themselves heard, or to gain a support by their individual efforts in an honest contest for existence. The rotten experts of to-day have reason to fear the development of the better system of cross-examination, which threatens their successful continuation, and therefore make feverish haste to get govermental and political support by methods peculiar to that ilk.

As to Dr. Corning's objections to "mental conundrums" propounded by cross-examining counsel, I must say that I differ with him. A true expert ought to be a psychologist, and hence, a logician; he ought to be able to look at the efforts of a lawyer to entangle him with calm confidence and a feeling akin to pity. He deserves to "go down" under such conundrums if he cannot answer them or expose their incoherence, for those propounded by many lawyers are incoherent.

W. H. H. RUSSELL: Mr. President and gentlemen—I am some what disappointed in the paper of the learned gentleman, in that he has not evolved some remedy for the defects that exist as to *expert evidence*, and if from his careful research he has not been able to solve the problem, you cannot expect that in a few moments' discussion we can cure the evil. *Expert evidence*, in the sense of "*medico-legal*," is one of the most important elements of wise jurisprudence, for in these money-getting and speculation times, when men carry about on their backs, on Broadway and Wall street, advertisements "*Headaches cured instantly*," we must expect will contests and strange mental freaks. In the contest of wills and legacies there is more or less necessity for skilful experts in the science of medicine. That the experts are not always satisfactory is not so much the fault of lawyers and judges as it is of the medical profession itself and medical colleges. If the medical schools, colleges and societies would see to it that chairs on medical jurisprudence were established and well filled by competent professors in all their institutions, there would be a higher standard of medical expert evidence. I cannot agree with some gentlemen in the belief that medical experts are easily bought. No *true medical expert* can be bought to knowingly testify falsely. The true, competent, and honorable practitioner in the grand science of medicine will not perjure his soul for mere money.

The medical expert, when called by an honorable lawyer, may conscientiously discipline his mind to the theory of the lawyer

upon the particular facts presented, and go into court with all the candor of his nature and testify as to those facts.

Sometimes a hypothetical case is presented by the opposing counsel which presents an entirely different theory, and the expert must say that if those facts were true, it might or might not change his opinion. Now, I am induced to favor ex-Judge Calvin's bill; it is a step in the right direction. Surely, if the Bench of this State were to designate such men in the medical profession as were commended by the schools and honorable members of that profession, it would relieve the courts and the community of that class of pretended experts who are neither a credit to the profession nor the courts.

I do not see the constitutional objection that my friend, Judge Hull, complains of. The sovereign power of the State, so far as the laws are concerned, is the Legislature, and the human spirit of legislation has provided that *insanity* shall, when proven, be an excuse for crime; the same sovereign power, in its legislative functions, can say what class of experts shall be competent under the *law* to establish that fact from a medical standpoint. It goes upon the theory that, admitting all the facts of the offence to be proven, yet, if the person was insane at the time of the act, then the law relieves of the penalty.

They are not the class of witnesses that are meant in the constitution which provides that the prisoner shall have the right to meet his witnesses face to face. The prisoner for the time being is supposed to be insane, and the courts, by the aid of the experts, are to protect him if the fact of insanity is established. If such a law was passed you would have better experts. Every graduate of a medical college would have to be regarded as a skilful expert, that when called into a court of justice in a civil or criminal case, he would be able to satisfy a jury of his fellow-citizens that he understood what he was called upon to testify to.

It would be the proudest and richest field for his exposition of the great principles of his profession, and the brightest triumphs of his professional career would be in the exalted domain of *mental* physiology. The study of the mind is the grandest of all, and the old philosopher was right when he said, "The proper study of mankind is man." Let us have, then, by proper legislation a proper standard of expert evidence. In our discussions in this Society we should criticise papers, and not praise them, unless they lead to some new and improved methods, and I have thus briefly touched upon the scope of the paper that my excellent friend would have something to reply to.

It was moved, seconded, and carried that further discussion be postponed until the next regular meeting of the Society, and the thanks of the Society were, on motion to that effect, tendered Judge Hull for his able and interesting paper.

Adjournment then, on motion, took place.

Twenty-First Regular Meeting, January 12th, 1885.

The twenty-first regular meeting of the Society of Medical Jurisprudence and State Medicine was held at No. 12 West Thirty-first street, on the evening of Thursday, January 12th 1885, Hon. William Barnes, President, in the chair; Dr. N. E. Brill, Secretary.

The minutes of the previous meeting were read and approved.

The trustees reported for election to active membership, Dr. M. J. B. Messemer, 150 Second avenue, and Mr. Chas. Blandy, Corporation Counsel's office.

The balloting for the election of these gentlemen resulted as follows: Dr. M. J. B. Messemer, for, 19; against, 1; Mr. Chas. Blandy, unanimously. Both gentlemen were therefore declared elected to active membership.

The following reports were presented:

Annual report of the Treasurer, Dr. E. C. Harwood, accepted and referred to the Board of Trustees.

Annual report of the Financial Secretary, accepted and referred to the Board of Trustees.

Annual report of the Board of Trustees, acccepted and ordered on file.

Mr. Eller presented to the Society, No. 7 of Vol. I. of the Transactions of the Mass. Medico-Legal Society—tor which the Society voted thanks; after which Hon. William Barnes delivered his valedictory address as President and introduced his successor, Prof. Frank Hastings Hamilton and the other newly-elected officers.

By request, Dr. E. C. Spitzka read the inaugural address of Prof. Hamilton.

VALEDICTORY ADDRESS

BY

HON. WILLIAM BARNES.

FELLOW MEMBERS OF THE SOCIETY OF MEDICAL JURISPRUDENCE AND STATE MEDICINE:—Under a clause in our constitution, it is provided that at the January meeting of each year no regular paper for the evening shall be read, but that in lieu thereof, the annual reports of the officers shall be made and addresses delivered by the retiring and the incoming presidents of the Society.

The Society has made substantial progress, and met with more than ordinary success during the second calendar year of its existence. The reports of the various officers will give the details of our membership and accounts during the past year, which has been one of unusual financial depression in nearly all departments of business life, not only in this country, but throughout the world.

The following is a condensed abstract of the papers read before the Society since those noticed in the last inaugural address of the President.

At the eighth regular meeting of the Society, held in October, 1883, a paper was read prepared by the Recording secretary, Dr. N. E. Brill, upon the subject of—

"*Medico-Legal Progress in Europe and America for the years* 1882 *and* 1883."

Dr. Brill's excellent paper comments mainly upon subjects treated of in European journals and magazines relat-

ing to forensic medicine, and exhibits some interesting features of legal practice connected with the continental official expert system. The learned reporter is evidently familiar with the current of events in Europe connected with medical jurisprudence. Doubtless many cases of this nature have occurred in our own country, the results of which, however, with rare exceptions can only be obtained by a laborious searching of the newspaper files and the Law Reports of the different States of the Union.

The ninth regular meeting of the Society was held in November, 1883, at which the paper of the evening was read by Dr. Charles A. Leale, upon the subject of—

"*Sun-stroke and its Medico-Legal Considerations.*"

Dr. Leale estimates that the total number of very heated days of an average New York City summer does not exceed ten days in the aggregate, and that with due precautions for safety, all serious danger from sun-stroke can be avoided. The Londoner, habituated to his smoke and fog and generally moderate temperature, is often oppressed by what is to him the excessive heat of a New York summer, and will succumb sooner than the average American. The author of the paper dreads excessive solar heat more than Asiatic cholera, and advises a total cessation from labor during these seven or ten days of the heated term, especially for men engaged in arduous manual labor in crowded factories, or when exposed to the direct rays of the sun; the author states that the habit of exposure is more common here than in the Southern cities of our own country or in Europe; and that the public welfare requires an actual discontinuance of labor, and that precautionary measures should be taken during these few days of each summer season.

The Registrar of Vital Statistics of the New York Board of Health shows that the average deaths from this cause,

for a period of ten years, reaches nearly one hundred persons each year. Attacks, however serious, not resulting in death, are not embraced in these statistics. The saving of these one thousand lives in ten years, if practicable, is surely worth the attention of this Society in its State Medicine Department of Public Hygiene.

Sun-stroke is considered to be immediately fatal in about one in ten cases, thus making the average number of cases occurring in the City of New York about one thousand per annum. The patients recovering are, however, exposed to a series of impairments in their physical, mental, and moral powers of a varied and complicated character, often leading to despondency and a suicidal tendency.

The tenth regular meeting of the Society was held in December, 1883, at which the election of officers was held for the ensuing year, and several amendments to the by-laws were discussed and adopted.

The eleventh regular meeting of the Society was held in January, 1884, when the inaugural address of the President was delivered and the annual reports of the officers made.

Dr. E. C. Spitzka also read a paper upon the "*Case of Graves, the Insane Murderer, recently executed in Newark.*" This execution was plainly unjustifiable under the circumstances disclosed as to his condition, and abhorrent to the modern ideas of criminal justice. This sentence should have been commuted to imprisonment, or, at least, the enforcement of the death penalty should have been delayed until his actual status could have been more fully and accurately ascertained. "Vengeance is mine, saith the Lord." We too often mistake the objects and purposes of human punishment, and the weak mortal clothed with a brief period of authority, usurps the functions of the Almighty and presumes to correctly judge and justly punish the offences of his fellow-mortals, for the accomplishment of

which task no human ken was ever sufficiently omniscient, and no human conscience ever balanced with sufficient delicacy. One of the most eminent elementary writers upon the Common Law (Sir William Blackstone) says ("Com.," Vol. IV., p. 11):

"As to the end or final cause of human punishments. This is not by way of *atonement or expiation for the crime committed*; for that must be left to the just determination of the Supreme Being; but as a precaution against future offences of the same kind."

The twelfth regular meeting of the Society was held in February, 1884, at which the paper of the evening was read by Dr. Jarvis S. Wight, Professor of Operative and Clinical Surgery at the Long Island College Hospital, being—"*A Plea for the Treatment of Criminals.*"

Dr. Wight, in persuasive and eloquent words, pleads for the wise consideration and just treatment of the most miserable of men, those who, from prenatal or postnatal circumstances, are afflicted with a criminal diathesis or tendency to crime, the momentum of which is almost irresistible. The learned professor advocates preventive measures as a partial remedy for crime analogous to the modern system of preventive medicine in disease; so that the crimes not committed and the diseases prevented may increase in number in the same ratio with the broadening mechanism of modern inventions and civilization. As one of the most potent factors to counteract the criminal diathesis, Dr. Wight strenuously recommends that every member of society should have a legitimate vocation, and that there should be "an imperative law compelling every one to work." If the masses of the community were educated up to this high standard, the well-being of the commonwealth would doubtless be highly subserved by the enactment of such a statute covering both sexes and applicable to all conditions in life.

Professor Wight's paper was ably discussed by Judge Amos G. Hull, Dr. C. S. Wood, S. B. Livingston, E. H. Benn, and Dr. E. C. Spitzka, whose somewhat divergent views can be examined at length in the first volume of the Society proceedings.

The exact line which divides sanity from insanity is a constantly recurring problem. Is it a line of latitude on one side of which is soundness and the other side unsoundness? Is there not a border region where lunacy and the opposite so blend as to almost defy human prescience and science?

Dr. Barnes, of London, testified, in the case of Mrs. Cummings on a writ *de lunatico inquirendo*, as follows:

"All persons were under some sort of delusion. Had, no doubt, a delusion himself, but did not feel called upon to expose his own infirmities. If a person was laboring under a delusion and reasoned herself into the belief of its being only a delusion, that would indicate soundness of mind. Delusions were no tests of insanity." (1. *Legal Examiner and Med. Jurist*, p. 30.)

The thirteenth regular meeting of the Society was held in March, 1884.

This meeting considered a proposed bill drafted by Hon. Amos G. Hull, entitled:

"*An act to provide for the establishment of wills during the life of Testators.*"

The provisions of the bill can be examined in the proceedings of the Society.

A letter was read from Hon. Delano C. Calvin, ex-Surrogate of New York City, to the President, in which, with great force, the writer urges that in such a proceeding it would be necessary to disclose the contents of the testamentary instrument, and that secret testamentary dispositions of property could not be made with *ante-mortem* probate, and that if the contents of such a will

were made public during the life-time of the testator it would tend to foster family difficulties, quarrels, and dis sensions, and that a testator might well dread such a controversy as much as an *ante-mortem* dissection of his body.

Mr. James B. Jermain, a large property holder in Albany, heartily approved of the bill, with a suggestion that it would not be necessary to publish the will unless the issue of undue influence was raised, when the reading of the will would be necessary as part of the proofs in the case. Mr. Tristram Coffin, an able lawyer of extensive practice in this class of cases in Poughkeepsie N. Y., favored the passage of the proposed bill, claiming that it deserved "a practical test" in this State.

The Hon. Judson S. Landon, of Schenectady, suggested several amendments to the bill in a letter to the President, and the Hon. Platt Potter, of the same place, also criticised some of the provisions of the bill as being unwise and inexpedient.

Dr. O. W. Wight, of Detroit, and Hon. George H. Hopkins, the author of the Michigan Act on this subject, in letters to Judge Hull commended the Act in that State as having met with general approval during the year in which it had been in force.

The contents of the proposed Act in this State was very thoroughly discussed by several legal and medical members of the Society. The discussion seemed to demonstrate that, so far as the question of insanity and competency were concerned, it would be of decided advantage to have these questions litigated during the lifetime of the testator; but so far as the question of undue influence is concerned a clearer and more satisfactory conclusion could be reached, and complications avoided by litigating this point after, instead of before, the death of the testator.

The Society passed a resolution recommending the enactment by the Legislature of an Act giving to testators the privilege of an *ante-mortem* probate and publication of their wills.

The fourteenth regular meeting of the Society was held in April, 1884, the paper of the evening being read by Dr. J. Henry Fruitnight, Fellow of the New York and of the American Academies of Medicine, upon the subject of

"*The Status of the Midwife, Legal and Professional.*"

The laws of New York State have not as yet recognized and regulated the vocation of the midwife, as is done in some European countries. In New York City the Board of Health keeps a register of midwives; the requisites to signing the list being a certificate from a College of Midwifery, or a recommendation from some reputable physician.

Dr. Fruitnight detailed from his personal knowledge several striking cases of malpractice by incompetent midwives which resulted fatally to either the mother or child, or both. Dr. Fruitnight, himself an accomplished obstetrician, states that no one can now practice the art competently, skilfully, or intelligently, unless he or she possesses some knowledge of all the branches of medicine and surgery, and that the preservation of human life and the public welfare demand that the State shall exercise some supervision over the practice of midwifery as an important branch of the medical profession.

The subject was very fully debated by the medical members of the Society and others, and in closing the discussion a resolution was passed opposing the passage of the bill before the Legislature for the incorporation of a college of midwifery unless so amended as to meet the present requirements of medical science, and of the Art of Obstetrics.

The fifteenth regular meeting of the Society was held in May, 1884.

Dr. Henry Howard, of Montreal, Canada, read a paper entitled:

"*Why Lawyers and Doctors fail to Agree.*"

Dr. Howard maintained that experimental philosophy was the only true basis upon which to found all jurisprudence—all medical jurisprudence, and all education, and all social order; and that physical science should be the beginning and ending of *all education.* If Penal Codes were based upon it, the criminal would be tried by nature's laws, for any offence against social order, and if convicted, he would be separated from society as an abnormal man that must be taken care of, both for his own sake and the protection of society, and to return to society only on becoming a normal man.

A paper was also read at this meeting entitled "*The Fillmore Will Case,*" by Dr. Landon Carter Gray, Professor of Mental and Nervous Diseases, New York Polyclinic, Physician in Chief to Department of Mental and Nervous Diseases, St. Mary's Hospital, Brooklyn.

Dr. Gray's paper contains a very elaborate and carefully prepared summary of the facts proved in this interesting case, from which it is apparent that Mrs. Fillmore was not capable of performing such a solemn act as the making of a will, and that she had become diseased both in body and mind to such an extent as to forfeit the *jus disponendi* of her estate. Probably, if her life had continued for a few years longer, the lunacy would have been so plainly developed as to have been incontrovertible.

The sixteenth regular meeting of the Society was held in the month of June, 1884.

The paper of the evening was one prepared by Dr. James G. Kiernan, of Chicago, entitled:

"*Paretic Dementia and Life Insurance: a Study of the Dwight Case.*"

Dr. Kiernan insists, with much apparent plausibility, that the "Dwight" case was improperly tried by the defense, and that the issue raised by them of suicide was an immaterial issue of subordinate importance; the real bar to the claim for $300,000.00 life insurance money being that the insured was, at the time the insurance was written, a pronounced paretic dement. It was claimed by the learned essayist that the autopsy revealed evidences of a diseased brain, and that the conduct of Col. Dwight also gave numerous evidences of paretic dementia which could have been readily diagnosed by a competent alienist, and that his normal expectation of life under the circumstances could not have exceeded the period of three or four years. Still the writer claims that the companies were liable upon the policies issued by them upon the ground that a paretic dement could not knowingly commit a fraud upon the underwriters, and could not wittingly have been guilty of a violation of the conditions of the policies by committing suicide. Dr. Kiernan concludes his paper by expressing his belief that the stockholders of the companies and the other policyholders suffered unjustly in the "Dwight" case from the stupidity of agents and medical officers, and from a mistake in the legal advisers of the defense in making a fight over the question of fraud instead of on the question of the validity of contracts made with the insane.

The seventeenth regular meeting of the Society was held in September, and was devoted to the discussion of Dr. Gray's paper.

The eighteenth regular meeting of the Society was held in the month of October, 1884.

The paper of the evening was read by Dr. N. E. Brill,

he Recording Secretary of the Society, upon the following topic:

"*An Argument Against the Hangman's Bungling.*"

Dr. Brill takes the ground that "hanging by the neck as a means of enforcing capital punishment is a relic of barbarism, and akin to the tortures inflicted by savages upon their prisoners of war and other victims.

The well-informed author says that the time has arrived for the introduction of a less brutal and less savage method of disposing of convicts condemned to death. If executions must continue to take place by hanging, Dr. Brill advocates the appointment, as in England, of expert executioners or hangmen, who shall officiate in all such cases in certain districts. The statistics of the doctor show that in only about one-third of the executions is the neck broken and instantaneous death effected; the excruciating tortures of more or less slow strangulation being a frequent occurrence, involving the most intense of all forms of human suffering. Several instances are related of bungling executions, at one of which the writer was a personal witness.

This able paper conclusively demonstrates that the practice of hanging should be relegated to history, and that when the state deems it necessary for its protection to take human life, some less barbarous and uncertain method should be adopted. Dr. Brill shows that the French guillotine and the Spanish garrotte (a steel collar tightened by a screw), are surer and more beneficent means of causing speedy death than the Anglo-Saxon method—by the gallows.

Death by the use of chloroform, ether, a salt of morphia, prussic acid, and by electricity, also, are discussed in the paper.

The merciful and painless killing of cattle, dogs and other animals in the large abattoirs and pounds this of

country has excited considerable interest and attention, and more scientific methods are being applied in some of our larger cities. Is it not time that some humane euthanasia should be also applied to those human criminals doomed to capital punishment by our laws?

Probably some popular prejudices exist in this country against executions by the garrotte and guillotine which might make it difficult to pass an act substituting either in our State Legislature. Some appropriate scientific solution of the difficulty by our expert scientists would immortalize the inventor and abolish the gallows forever.

C. M. Tidy, medical jurist and writer, says:

"Taking a convict's life by suffocation is inhumanly painful, unnecessarily prolonged, and revolting to those whose duty it is to be present."—Tidy, Vol. II., p. 384.

The accomplished author of this able paper has the satisfaction of knowing that within the period of four months from its delivery the principles advocated therein have received the indorsement and recommendation of Governor Hill in his recent official message to the State Legislature as follows:

STATE OF NEW YORK, EXECUTIVE CHAMBER,
ALBANY, Jan. 6th, 1885.

To the Legislature:— . . . The present mode of executing criminals by hanging has come down to us from the dark ages, and it may well be questioned whether the science of the present day cannot provide a means for taking the life of such as are condemned to die in a less barbarous manner. I commend this suggestion to the consideration of the Legislature."

As marking the progressive eras of humanitarian civilization since the era of Sir William Blackstone (A.D. 1765), I beg leave to recall to your attention the fact that only one hundred and twenty years ago he deemed it

matter for national pride and boasting that in England "*torture* was unknown" in its criminal administration.

I respectfully recommend to the Society that the new President be empowered to appoint a select committee of seven members to take this subject into consideration, and to appear before the appropriate committees of the Senate and Assembly as representatives of this Society in aiding appropriate legislation.

The nineteenth regular monthly meeting of the Society was held in November, 1884.

The paper of the evening was one carefully prepared and read by Dr. William L. Hardy, City physician, entitled:

"*The Rhinelander Case.*"

This was a proceeding to test the sanity of William C. Rhinelander before a Commission of Lunacy preliminary to trial on an indictment for an attempt upon the life of a New York lawyer, Mr. John Drake, who was shot at by Rhinelander with a revolver and dangerously wounded in the humerus.

Dr. Hardy insists that, from his personal examinations, and by taking all the circumstances together in the life of Rhinelander as shown by the evidence, from his collegiate days to the time of the shooting, a plain case of imbecility, illogical reasoning, infirm, delirious and perverted judgment are shown all through his career, and that his insanity is of that kind designated as primary monomania, complicated with some mental and physical symptoms of general paresis.

The twentieth monthly meeting was held in December, 1884, at which session a paper was read by Hon. Amos G. Hull, on

"*Expert Evidence.*"

Judge Hull stated that very few important trials are now

held, either of a civil or criminal nature, at which expert evidence of some kind is not required.

It is obvious, that as new inventions are discovered and applied in our modern civilization, new expert questions and numerous complications arise where the services of scientific and practical experts are necessary in divers legal proceedings and controversies.

Such problems are perpetual, and their solution is required under constantly varying circumstances. Rarely does any question even upon the same point arise under exactly the same circumstances and surroundings.

The increasing importance of expert testimony is leading to a more critical examination of the Law of Evidence relating to this subject, and of the evils and advantages of the system at present prevailing in this country. The law upon this subject has never been a matter of statute regulation either here or in England, but has been systematized and crystallized by a series of English and American adjudications, which represent the combined wisdom of several generations of excellent judges in the numerous courts of the two countries. It is now proposed, in a sister medico-legal society, to supplement this body of unwritten law by a statute, a portion of which is given in Judge Hull's Paper.

The proposed Act is entitled:

"*An act to provide for the designation of Medical Experts, and their attendance and examination as witnesses in certain trials and proceedings.*"

The first section provides that the four sets of Department Justices composing the General Terms of the Supreme Court in this State shall meet in July in every two years and designate for that term, "with the advice of such medical societies or authorities as they may deem useful," medical experts for each Judicial Department, "who shall

be learned and experienced in, and possessed of special knowledge of, *mental diseases*."

The second section provides that when a question of "mental capacity or soundness shall be involved or may arise, and in which *mental* experts are intended to be called and examined," that the trial judge may, after hearing the parties, designate the number and names of such official experts, to be called on such trial, and that on the parties depositing with the clerk the amount of fees prescribed by the Court, such official experts may be summoned and give their testimony; and it is further provided by the said section that "*no other mental experts shall be examined upon such trial.*"

Waiving for the present all discussion as to the propriety and constitutionality of such appointments being made by the Justices of the General Terms of the Supreme Court, which Judge Hull shows to be serious questions, it would seem that the proposed legislation is very injudicious, and greatly inferior to the present system in the elucidation of truth in such cases.

The body of the act proposes to provide only for cases where "mental capacity or soundness" are involved, or for the appointment of official mental experts only. If the provisions of the act are desirable for cases of insanity and mental capacity, then it is certainly equally desirable to have official experts appointed on all other medical questions which may arise in legal proceedings, viz., surgeons, obstetricians, dentists, specialists on diseases of the eye and ear, heart, lungs, nervous disorders, and all other ailments enumerated in the long nomenclature of human diseases, and we cannot even stop here, as all other expert testimony should be equally guarded, and mental experts have no claim to special protection any more than the hundred other departments of human knowledge, as to which expert testimony is often required

in a court of justice. Assuming the principles of the bill to be correct, official experts should be appointed also in each department, to give their testimony on the question of the value of legal services and counsel fees, and who should have the monoply of fixing such values. Exclusive official experts should be appointed in questions of chirography, hand-writing and forgery. Exclusive official experts should also be appointed in the several departments of the science of navigation. Exclusive official experts also in the numerous departments of actuarial, scientific and professional knowledge involved in marine, fire, life, and other insurance questions arising in our courts. Also in the several departments of science involved in patent questions which would almost cover the whole curriculum of human knowledge. Also in diseases of horses, dogs, and other animals.

The same laws should also regulate expert evidence as to the engraving of seals, the genuineness of postmarks, the quality and character of paintings and works of art, questions relating to surveying, engineering, chemistry, microscopy, electricity, dynamite, and other explosives, and indeed the whole cosmos of human knowledge, either now or hereafter to be within reach of human ken or experience.

It is evident that such a system is altogether utopian and impracticable.

The most objectionable feature, however, in the proposed bill is the one which attempts to exclude on the trial all other expert testimony except that of the official experts. This is an attempted outrage upon the natural rights of litigants to which no free people would have submitted even generations before American independence was established. It is hardly debatable on American soil, and should be unanimously rejected by any legislative body between the two oceans.

In the report of the majority of the Committee on Experts of the Medico-Legal Society published in December, 1883 (*Medico-Legal Journal*, Vol. I., No. III., p. 315), the following statement is made:

"Let us suppose, as often happens, a distorted statement of facts presented to the medical expert, on which he is asked to predicate his opinion; afterward a new and true statement is given; they call for a different opinion; *he knows not which is true.* Is it likely that he will *change* the opinion which he had previously given forth to the public? *No!* The spectre of stultification is ever haunting him; his reputation for wisdom and consistency is at stake. Will he not *turn and twist* all his answers to support the opinion he had previously given? Human nature is but seldom capable of acknowledging its mistakes. Such conduct calls for divine strength and resolution."

The above extract exhibits a lack of appreciation of the true legal functions and duties of the expert witness, which is fully paralleled in the same extract by the lack of conscience and moral sense attributed to such witnesses.

Any expert witness on the stand who would not, through fear of stultification, change his opinion under an altered state of facts is guilty of moral, if not legal, perjury, and is utterly incompetent and unreliable as an expert, or any other witness. The anecdote of the Irishman who said, on his cross-examination, that if he had said that the horse was twenty feet high he would stick to it, is related as a joke; and it seems scarcely credible that a majority of the Committee on experts in our sister society should degrade all medical experts as the equals only of this Irish witness.

The committee say that in conflicting statements of fact by the parties, the expert witness does not know which is true; but do the committee consider that, so far as the expert testimony is concerned, it makes not the slightest

difference which statement of fact is true, or, indeed, whether any of the statements of fact are true. A scientific answer to a *hypothetical* question can be given as readily as upon a real state of facts.

An expert witness is neither a jury nor a judge trying the case. Being a little nearer to the Creator by his superior scientific knowledge, he reverently, and with an ever present consciousness of unseen depths beyond, lifts the veil of obscurity, so that the court and jury can see more of the truth revealed through the telescopic vision of the witness who is sworn to tell the truth, the whole truth, and nothing but the truth.

A learned writer on legal medicine says:

"The expert witness should never attempt to arrogate to himself the functions of the jury."—*Vol. I., p.* 25, *Tidy's Legal Medicine.*

Baron Alderson said:

"I will not permit any medical witness to usurp the functions of both judge and jury."—2 *Beck's Med. Jur., p.* 971.

See also the following authorities:

"It is not the province of a witness testifying as an expert to draw inferences from the evidence of other witnesses unless the facts testified to are clear and *uncontroverted*, or to take into consideration such facts as he can recollect that have been testified to, and *thus form an opinion;* but he should have full information of *the ascertained or supposed state of facts* upon which his opinion is based.

"When the facts are controverted, or are not entirely clear, a *hypothetical* question may be put, based upon the facts claimed to have been proved."—*Guitemon* vs. *Liverpool and N. Y. Steamship Co.*, 83 *N. Y. Rep.*, 358.

"In framing hypothetical questions to be put to expert witnesses, counsel are not confined to facts admitted or absolutely proved, *but facts may be assumed* when there is

any evidence tending to establish them which are pertinent to the theory they are attempting to uphold.

"Upon cross-examination of an expert for the purpose of testing his skill and accuracy, counsel, in putting *hypothetical questions*, may assume *any facts* pertinent to the inquiry, whether testified to by witnesses or not, subject, however, to some extent, to the control of the trial court." —*Dilleber* vs. *Home Life Ins. Co.*, 87 *N. Y. Rep.*, 79.)

"The fact that a medical witness attended and testified at the instance of one party, under agreement for a considerable compensation, which was unknown to the other party until after the witness' testimony was closed, is not in itself an irregularity affecting the verdict.

"It is proper for the District-Attorney to procure the attendance of skilled witnesses in appropriate cases for a special compensation.

"A witness meets the requirements of a subpœna if he appears in court when required to testify and gives proper impromptu answers to such questions as are put to him. He cannot be required, by virtue of the subpœna, to examine the case, to use his skill and knowledge, to form an opinion, nor to attend, hear, and consider the testimony given, so as to be qualified to give a deliberate opinion on a question of science arising upon such testimony; hence a professional witness called an expert may be paid for his time, services, and expenses, and the question what amount is paid cannot, in the absence of anything to show bad faith, affect the regularity of the trial, though it may, perhaps, affect his credit with the jury."—*People* vs. *Montgomery*, 13 *Abbott's Pr. Rep., N. S.*, 208.

"The prisoner was on trial on an indictment for the murder of his wife at Rochester, N. Y., on the thirteenth day of November, 1870.

"In any event, the opinion of an expert of the *probability* of a mental derangement, deduced from an autopsy,

would be overcome as proof of the mental condition of the decedent by the testimony of one competent observer of the appearance, conversation, conduct and characteristics of the decedent for a series of years in his domestic, social and business relations."—*La Bau* vs. *Vanderbilt*, 3 *Redf.*, 384; 425–427. *Hon.* D. C. CALVIN, *Surrogate, N. Y.*

"Persons not experts, after testifying to facts and incidents in relation to a testator tending to show soundness of mind or the contrary, may testify to the impression produced upon them thereby, and also whether the acts and deductions testified to seem to them rational or irrational, but they may not as to the general soundness or unsoundness of mind of the testator, or as to his capacity to execute a will."—*Hewlett* vs. *Wood*, 55 *N. Y. Rep.*, 634.

The court can exclude expert evidence if it appears that the witness is not qualified to give his opinion as an expert.—*Hoyt vs. Long Island R. R. Co.*, 57 *N. Y. Rep.*, 628.

"Whether one offered as an expert is qualified to speak as such is a fact preliminary to his testifying to be determined by the court upon the trial."—*Nelson vs. Sun Mutual Ins. Co.*, 71 *N. Y. Rep.*, 455. FOLGER, J.

There is doubtless on the part of the medical profession too much sensitiveness to cross-examination. This results in part from the difference in life between the lawyer and the physician. The physician is accustomed to dictate, and his absolute authority in the sick-room and hospital is seldom questioned, and if coupled, as it so often is, with gentleness of manner and recognized skill in his profession, it is gladly accepted both by the patient and his friends. After several decades of such a life, its follower is often disposed to resent sharp criticism and contradiction and questioning as a personal insult or attack upon himself or his reputation. The lawyer, on the contrary, is always met by the opposition and conflict of an active and intelligent opponent, and both gladiators are daily sub-

jected to the decisions of a court. The discipline of such a life is totally variant to that of the physician, and ultimately moulds, to some extent at least, the public characters of both professions.

A qualified expert should never fear cross-examination. He is on the stand for the elucidation of truth. Unless he has personal knowledge of the facts by an autopsy examination or otherwise, he has nothing to do with the facts of the case. His evidence is abstract, not concrete. He is not either the court or the jury whose duty it is to try the case, he is giving evidence, enlightening the court and jury as to scientific matters of which they are presumed to be ignorant, and in so doing is giving his opinion and expert knowledge. If asked whether two and two added together make four, he is simply to answer, not to question the facts as to whether there are two and two to be added together. The Committee on Experts above cited would seem to claim that an expert, if called by a party to prove that two and two added together make four, would make the same answer if the facts were changed to two and three added together, for fear of stultifying himself. Experts are supposed to have had a superior education to ordinary witnesses, and such advantages should be shown by a superior conscientiousness and regard for truth for its own sake. If a cross-examination tends to open up to the witness a different range of vision and to modify *prima facie* impressions, no one ought to be more rejoiced than the expert himself, especially in questions where vast amounts of property are at stake and even human life on the results of his testimony. The pure molten metal of truth only runs from the fiery furnaces of conflict and cross-examination.

Tidy says:

"There is a *scientific certainty* which only the coward treats as *uncertainty;* and there is an uncertainty which

only the boldness of ignorance ignores." (*Legal Medicine*, Vol. I., p. vii.)

In Germany, the medical faculty of each judicial district appoint a special commissioner to whom questions are referred. (*Wharton's Med. Juris.*, Vol. III., p. 274.)

In Prussia, the expert system consists of:

(1) The county physician and county surgeon.

(2) The medical college of the province consisting of the chief president, the government medical counsellor, two medical counsellors, a pharmaceutical assessor, and a physician whose specialty is the diseases of animals.

(3) An appellate medical commission for the whole monarchy. (3 *Wharton's and Stille's Med. Juris.*, § 898.)

In France, a judge calls in experts at his discretion (id., § 898).

If any statute legislation is necessary on the subject of expert testimony, would it be expedient to undertake the recommendation of any legislative action beyond the passage of a simple act containing some such provisions as the following:

An Act to enable a trial court or judge to summon expert witnesses in certain cases.

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

§ 1. A trial justice or judge of any court of record in this State, in the trial of any issue before him in an action or special proceeding where the testimony of expert witnesses is necessary on any question at issue, may in his discretion summon any qualified expert witness to attend the trial or hearing of such issues and give expert evidence; the fees of such expert witnesses to be the same as those of Referees in the Supreme Court and to be certified by the presiding judge, and the same are hereby made a County charge on the County where the venue is laid, to be audited by the Board of Supervisors of such County.

In conclusion, I congratulate the Society upon the election of my successor, Prof. Frank Hastings Hamilton, as President for the year 1885. His able works upon Frac-

tures and Dislocations, the Principles and Practice of Surgery, United States Sanitary Commission, Surgical Memoirs on Military Surgery and Hygiene, and other subjects, have already made his name known and famous in two hemispheres as one of the ablest, most practical, and distinguished writers upon medical subjects of any living author. Some of these works have passed through several editions, and have been translated and published in foreign languages. The direction of his attention to the subjects of state and forensic medicine will doubtless result in great advantages to the Society as well as to the State and nation. Some of us too, cannot, as long as the red current flows in our veins, forget his faithful surgical services to our second martyred President, James A. Garfield, whose promising career as President was so suddenly ended by assassination almost at the commencement of his presidential term.

I take great pleasure in presenting to my fellow-members of the Society, Dr. Frank H. Hamilton, as their President-elect for the ensuing year.

INAUGURAL ADDRESS

OF

FRANK HASTINGS HAMILTON, A.B., A.M., M.D., LL.D.,

Consulting Surgeon to Bellevue Hospital. Delivered before the Society of Medical Jurisprudence and State Medicine, Jan. 8th, 1885.

GENTLEMEN:—I thank you for the honor you have conferred in making choice of me as your presiding officer for the ensuing year; but you will pardon me if I choose to consider it as evidence of your personal friendship rather than of a conviction on your part of my special fitness for the place. I find a warrant for this conclusion in the fact that I have no claim to distinction in either of the departments of science for the cultivation and advancement of which your organization exists, and also in the fact that most of you were associated with me in another Society, organized and conducted for a similar purpose; in which Society, I trust I may be permitted to say, we formed mutual friendships, which have ripened by the lapse of time. For myself, at least, I am at liberty to say that toward most of you I entertain such sincere sentiment of respect and affection, that if, in the position you have assigned to me, I can render you any service, it will gratify the most cherished instincts of my nature.

In order, however, to render the performance of my duties efficient, your active individual co-operation will be required. The special labor in which we are engaged can only be successfully conducted by the employment of artisans experienced in several distinct branches, namely,

in law, medicine, chemistry, psychiatry, pathology, and general hygiene or state medicine. One man brings to us the bricks, another the mortar, and together we build. But if the workmen are idle, it will be our mortification at the close of the year not to find the structure advanced, at least by our labors, beyond the foundations which our predecessors have laid. We must remember also, that upon the quality rather than the quantity of the materials brought together will depend the harmony and stability of the structure we erect.

At the last regular meeting of this Society, as I am informed, the Hon. Amos G. Hull, your Vice-President, read a very able and instructive paper on the subject of "Expert Evidence," the discussion of which was postponed to this evening. Although I do not know the precise direction and scope of the writer's remarks, and cannot, therefore, properly take part in the discussion, I am sure it will not be deemed impertinent if I avail myself of the present opportunity to supplement in some sense his paper, by giving my own views upon the cognate subject of "Expert Medical Testimony" in general, but with special reference to this kind of testimony in cases of alleged lunacy.

MEDICAL EXPERT TESTIMONY, WITH ESPECIAL REFERENCE TO CASES INVOLVING THE QUESTION OF INSANITY.

From time to time within the last few years, and perhaps for a longer period, comments have been made in the daily secular press, and occasionally in the medical journals, in reference to the testimony of medical experts, which were anything but flattering to medical men. These comments have, in most cases, had reference to their testimony as experts in cases of alleged lunacy, or in cases involving the question of moral responsibility. They have been charged with ignorance, incompetency, inconsist-

ency, and in some cases with venality. It has been said that their opinions are purchasable.

In support of these grave charges the reader has been referred to the fact that an equal number of eminent experts can usually be found to testify on either side, and that in their testimony they often differ from each other irreconcilably. In other cases no evidence is offered to sustain the charges, except the fact that the opinions of the writer and of the public differ from that of the expert.

In what I shall have to say upon this subject I propose to confine myself to those examples in which the question involved is one of mental capacity and responsibility, as being that in which medical experts have been most often and most severely criticised. To a certain extent, however, you will observe that the arguments employed will apply to expert testimony in any other department of medicine or of science.

1. Medical men, whether they be specialists in the study of mental diseases or not, in the differentiation of the class of diseases now under consideration, labor under peculiar difficulties. There are many mental disorders which are unaccompanied with any recognizable abnormal physical conditions of the brain; that is to say, in which there are no structural lesions of the brain cognizable during life, or which can be satisfactorily demonstrated in the autopsy; and there are many in which the mental alienation cannot be fairly traced to any lesions in any other part of the body. The number of these examples may hereafter be found to be smaller than is now known, but for the present the fact is as I have stated. That a functional disturbance of the brain exists in such cases is self-evident: but for aught we know this may be due to some slight molecular, chemical, or vital changes in the nerve-cells of the gray matter of the brain or of a group of cells, not de-

noted by any peculiar physical signs during life, and which can leave no possible traces after death. To cause mental derangement, it may be only necessary that these microscopic cells should be temporarily deprived of their normal supply of oxygen through the vascular system; or, on the other hand, a slight increase in the supply of the proper nutriment or stimulus may cause the same results. A simple loss of equilibrium, or change of tension in the nerve-cell, may cause delirium. These abnormal physical conditions may be temporary or permanent, but in either case they will probably, in the future as in the past, elude the most careful observation of the physician, the chemist, and the microscopist. Science has calculated the vibrations of the musical chord, and measured the oscillations of a ray of light, but has not estimated the vibrations of the living intellectual nerve-cell, nor analyzed its aura which waits incessantly and instantly upon its will. It has furnished no means, therefore, of determining mathematically when the mysterious organ of the mind is out of tune, or why its notes are discordant.

2. Hitherto no one has furnished a definition of insanity which will cover all of the supposed examples. Nor, considering the nature of the subject, is it probable that it will ever be done. It may be easy to differentiate a certain class of cases. We can say, without fear of contradiction, that a raving and uncontrollable maniac is insane, or that another, whose life has been uniformly consistent and harmonious, is sane. But this is not the class of cases in reference to which our opinions are asked. They do not give rise to litigation or dispute. Our opinions are only asked when there exists some room for doubt as to the exact mental condition of the person in question, and who therefore occupies a position near the borderlines which separate insanity from sanity; but no legal or scientific authority has established these lines. They

are not indicated by broad rivers, or mountain-ranges, such as form the natural boundaries between nations; but the opposite conditions here become insensibly merged, in such a manner that no one can say where one ends and the other begins. One might as well attempt to determine the exact limits of the auroral lights.

Says Ray, in his clasical treatise on "Mental Pathology," "One source, and perhaps the principal, of the prevalent error, is the habit of regarding insanity as a sharply defined phenomenon, easily separated from all accompanying incidents, like an earthquake or a chemical action, instead of a condition arising from obscure beginnings, culminating more or less rapidly, and declining by imperceptible steps, as the darkness of night is succeeded by the light of common day." In these doubtful cases the expert has to consider the possible motives of the individual, his hereditary tendencies, his education, social influences, his previous habits, his condition as to health or disease, and a multitude of other matters, all of which are to be carefully weighed and balanced against each other, before he can form a correct judgment as to whether a certain act or line of conduct implies insanity and irresponsibility or not. That there should not be exact, or, in many cases, even approximate concurrence of opinion among experts of equal qualifications, is natural and ought to excite no surprise. Those are the unreasonable persons who expect anything else. Of course, it is desirable that there should be no disagreement, since in the decision of so nice a question one grain of testimony, more or less, cast into either scale may decide the life or liberty of the person whose case is before the court; but for the fallibillity of human opinions, at least to the extent now supposed, no remedy has as yet been provided.

3. If it be true that expert testimony, when questions of sanity or of moral responsibility are involved, is often con-

tradictory and irreconcilable, it is equally true of expert testimony where questions of much less complexity are involved. It is true in nearly all cases of dispute upon matters of science, art, or commerce. In the Feuardent-Di Cesnola suit we have seen one expert in archæology affirm that a piece of statuary was as it came from the hands of the original artist, while another has declared with equal confidence that it was constructed from fragments obtained from different sources. In the investigation which followed the Ashtabula catastrophe, it was ascertained that one man, who was supposed to be both theoretically and practically acquainted with the construction of railroad bridges, had declared this bridge to have been built according to the most approved system, and that it was perfectly safe, while another expert had expressed a contrary opinion; and this important question was left to be finally and definitively settled when the bridge had given way under the weight of a passing train, and twenty or more lives were lost.

Does it often happen, in any class of cases, that lawyers are unable to obtain expert testimony for their clients, in case they stand in need of it, or that the testimony on the two sides is not conflicting?

Not alone experts, but lawyers also, if we can accept their own statements, do not often agree in opinion as to the merits of the cases of their respective clients. The courts indeed are far from uniformity in their decisions and their interpretation of the law and the facts.

It has been asked: "If witnesses are not suborned, how does it happen that experts so uniformly testify in the interest of the parties by whom they are employed?" As if it were a question which admitted of but one answer, namely, that the witness gave his testimony under oath, only as a consideration for the pay he was to receive, and without

regard to the sanctity of his oath, or to the value of his reputation as a citizen and a man of science.

This question, asked no doubt seriously, will be answered seriously. Because no intelligent lawyer would call an expert witness to the stand until he had ascertained, after a full statement of the case to him, what his opinions were. He would not summon a witness who would certainly, or even possibly, damage the cause of his client.

It is fair to conclude, from the preceding statement of facts, that the supposed evils of the present system of procuring expert testimony in cases of alleged lunacy have been greatly exaggerated, if they are not wholly imaginary. Such cases are not decided by the experts. Having given their opinions under a direct examination, they are subjected to a sharp cross-examination by skilful attorneys, who subsequently, and after sufficient time has been given for study and reflection, are permitted to argue the case to the jury. The judges comment upon the law and facts relating to the case; and, finally, the jurors, rendered thoroughly familiar with all the points in dispute, and acting independently, render the verdict; and they are better able to do this intelligently than they would have been if there had been no discussion.

It is evident, also, that the supposed evils are not limited to one, but that they extend in an equal degree to all other classes of expert testimony.

Those who are of opinion that the evil is actual and serious have from time to time suggested various remedies.

It has been suggested that experts should be appointed as advisers to the courts, by the State or municipal governments.

Against this method lies the grave objection that the public can have no assurance that the best men would be chosen. The appointing power might be influenced by personal or political motives, rather than by the acknowl-

edged fitness of the person chosen; and it could provide for experts in only one class of cases, since no man could be an expert in all cases in which his services were required.

If it is proposed that the courts should themselves, as occasion might arise, make the appointments, the method would still be liable to the objection that even the courts could not always be relied upon not to make choice of improper men, either because they were uninformed, or entertained personal friendships.

To a certain extent, in cases where the ends of justice plainly demand the exercise of this authority, the courts, or the attorneys who officially represent the courts or the government, are, under existing laws, permitted to summon expert witnesses; and, in the narrow limits within which this power is now authorized and exercised, it can do no harm. It is only against the exercise of this authority as an exclusive or even general mode of obtaining expert medical testimony, that I desire to record my protest.

In whomsoever the power to make these appointments may be vested, and in whatever manner it may be exercised, and whether the experts may be subject to cross-examination or not, in either case it seems to me liable to work injustice. It happens often that the accused comes into court under the imputation of a verdict of the coroner's jury, and under the adverse influence—more or less—of a presentment or indictment of a grand jury, both of which may be, and usually are, based upon *ex parte* testimony. The State or district attorney is the representative of these preliminary courts in the prosecution of the accused, and he has already prejudged the case.

It would seem that the State has, in these manifest advantages, all the *ex parte* aid to which it is entitled, or which the ends of justice demand; but if we now add the

testimony of an expert, perhaps not subject to a cross-examination, who has received his appointment from the State or court, and the opinions of the expert chance to be adverse to the accused, the latter enters upon his defence with the additional disadvantage of his case being probably prejudged by the court as well. Thus heavily handicapped, his chance of making a successful defence must be very small indeed.

This method of securing expert testimony seems to me also contrary to the spirit and genius of our institutions, but in harmony with the institutions of the greater part of Europe, where the tendency of governments to concentrate power in themselves and in the courts, as instruments of the governments, is known and admitted.

In our system of jurisprudence and, I may say, in the Anglo-American system, the personal rights of the citizen are as carefully guarded as those of the State. In the present case, the State has certainly its equal share of protection, and by the proposed change it would have more than its just share.

I make no reference to the other means provided by the State for the determination of questions of insanity, such as commissioners of lunacy, etc., because they are in no way connected with the matter now under consideration, namely, the proper method of securing testimony in courts of law.

During my temporary residence in Paris in 1844, it was a matter of common remark among medical men and medical students that Orfila, the celebrated chemist, and the official adviser of the crown in certain matters of expert testimony, had committed a great blunder in a recent case of supposed poisoning by arsenic, and that the error had been detected and exposed by a member of the Academy of Medicine, but that the disclosure of the error came too late to remedy the injustice and harm it had done. He was

charged with having been the instrument of like injustice to others, and was frequently spoken of as the "king's executioner."

I do not relate this as reliable history, but only as my recollection of the common gossip of the day; but whether the accusations were true or not, they were plainly such as might reasonably be made and justified under a system of jurisprudence in which the professional expert is an appointee of the crown, and is regarded in the light of an official adviser.

In some cases which have come to my knowledge, the public has seemed to form its opinion as to the nature and value of the expert testimony solely from the verdict rendered by the jury. In the case of The People against Cole, tried at Albany in 1868, Judge Hogeboom presiding, the jury rendered a verdict of acquittal on the ground of unsound mind; but no medical expert had testified that Cole was insane. In the course of my examination as an expert witness, the court asked me whether I thought "that Cole, at the time he committed the act for which he was under trial, knew the difference between right and wrong, and that the act was in violation of the law." To which I replied in effect that "Cole, being suddenly confronted by the man who had wronged him, did not probably consider whether the act which he was about to commit was in violation of the law or not." If the jury made use of this reply to pronounce him insane, the responsibility of their verdict does not rest upon me. Their verdict of "unsound mind" was given, as it has been in many similar cases, because they did not think he ought to be punished for the act, and they were quite willing to give a very broad and partial interpretation to any testimony which in the remotest degree seemed to favor the defence. Subsequently, from several sources, I learned that my tes-

timony, inferred only from the verdict, had been subjected to criticism.

The question put to me by the judge, although not so broad as it is usually made, no doubt had in view the legal definition or tests of unsound mind, and which, with a few slight modifications, has been incorporated into most systems of jurisprudence. But no legal definition of unsound mind can ever be properly made; and for the simple reason that no scientific definition is possible. The latter fact has generally been admitted by writers upon mental disease; but, nevertheless, they have often attempted to make what they are pleased to term approximate definitions, for the purpose, as they have declared, of furnishing at least a guide in the proper direction. Upon these approximate definitions the law-makers have constructed their legal definitions or tests; no longer intended as guides simply, but as authoritative and sharply defined distinctions, which the courts are compelled to recognize. Whether these tests be applied in a scientific or legal sense, they are in my opinion unsound, unjust, and confusing; they are calculated to mislead the judgment rather than to direct it to a proper conclusion. They ought, therefore, to be abandoned, and the whole matter left to the common sense of the jurors, aided and enlightened by the testimony, the arguments of the counsel, and the exposition of the courts.

4. While, in what I have said, I trust I have shown a purpose to defend my professional brethren, when appearing in the *rôle* of experts in lunacy, against unjust criticism, by maintaining the undeniable proposition that, other things being equal, they are the most trustworthy witnesses, I am at the same time prepared to say that they are not the only persons or classes of persons whose opinions as experts may be valuable in matters of this

sort, or whose opinions might not, in some cases, be safely substituted for their own.

In reference to questions of sanity or insanity, most men of intelligence who have reached adult life are experts. It is, with all of us, the daily practice of our lives to observe and study men's conduct and motives, and we are quick to discover the smallest evidence of mental unsoundness, especially in those with whom we have intimate personal acquaintance. Indeed, in most cases the mental alienation is suspected or well known long before the case is brought under the notice of the alienist.

It is not the same, however, in reference to most other subjects in which the services of experts are demanded. It is not so in most matters pertaining to either science, art, commerce, or the general business of life; in all of which the average citizen is presumably without experience or knowledge, and without the aid of the expert he could not intelligently perform the duties of a judge or of a juror.

If the question involved were one of mineral or vegetable poisoning, the trial of the case without the assistance of a practical chemist would deservedly expose the court and the law to public contempt.

If, again, it were a question whether the neck of the thigh-bone had been broken within or without the capsule, involving, as this question does, in a great measure, the degree of permanent injury which the patient has sustained, without the aid of an experiencd surgeon it would be impossible to place the case fairly before a jury, not one of whom, probably, had ever seen either accident, or knew that they were not identical.

Finally, there is reason to fear that in one direction professed alienists are more liable to err than most other men of learning and experience, but who have not confined

their studies so exclusively to the specialty of mental diseases.

It is a fact of common observation that, in all departments of medical science, the specialists to whom our science is indebted for some of its most important improvements and discoveries, are inclined to extend the range or number of diseases and of sympathies referable to the organs of whose lesions they have made a special study. This they do conscientiously, sometimes wisely and sometimes unwisely—their errors being exposed when some other specialist traces the functional disturbance to a lesion of some other organ, or the general practitioner demonstrates that all or nearly all the organs of the body are suffering from a general dyscrasy, and that the lesion of no one in particular can fairly be held responsible for the particular symptoms in reference to the cause and treatment of which the specialist is consulted.

Alienists need to be reminded that they have shown the same tendency to increase the number of diseases under the title of insanity, and to widen the range of their specialty, by including a great many eccentricities and moral obliquities under this title; and that by so doing they have virtually relieved the subjects of these peculiarities from responsibility. This is seen in the adoption of the terms monomania, moral insanity, insane impulse, insane delusion, and in the additions made from time to time by writers to the varieties of monomania, among which are placed kleptomania, pyromania, erotomania, theomania, dipsomania, homicidal mania, suicidal mania, etc.

Spitzka, in his recent treatise on "Insanity," which work has at once taken rank among the highest authorities upon this subject, speaking of monomania, says: "Here those alienists who delighted in burdening the infant science of psychiatry with new systems of classification, found a fruitful field for innovation. Whatever the direction in

which a lunatic manifested his most prominent symptoms, that direction determined the coining of a new term. . . . The designations 'Gamomania,' or 'the insane desire to marry,' or 'Frauenschuhstehlmonomanie,' or 'the mania for stealing women's shoes,' are imperishable monuments of this folly." To which judicious remarks I will add that, if such acts or mental conditions are to constitute a basis for the classification of insanity, I see no reason why it should not extend to every faculty, sentiment, or emotion of the mind, and to every act of eccentricity or of viciousness which disfigures human conduct.

Rush, the author of "Medical Inquiries and Observations on the Diseases of the Mind," has been quoted as having said that all men were insane on some subject. To the same conclusion it would seem that certain alienists are inclining. If this be true, then the whole matter we have been considering becomes greatly simplified. All men are insane, and all are irresponsible.

It would be unjust to Dr. Spitzka, in whose opinions I have expressed a concurrence, as well as to myself, if I did not state that Dr. Spitzka is willing to retain the name monomania when the use of the term is accompanied with certain reservations and restrictions, "with the limitation that the prefix shall be understood to denote that the insanity extends in a special direction across the mental horizon." He justifies the continued use of the term, but not its abuse.

It is upon this point alone that our opinions diverge. I cannot think it advisable to retain the term monomania, or any of the subordinate terms, either for purposes of classification or for the convenience of clinical description. Most alienists are agreed that, even when they use these terms for classification, they do not mean to say that the subject is insane upon only one point, but this is exactly what the term means, if it means anything. It is true that different

alienists offer different explanations or definitions of the term, but nearly all admit that it does not mean insanity upon a single subject; and every one must have seen that, with or without explanations, the use of this term by writers and by expert witnesses renders it difficult, if not impossible, for the reader, the public, or the jury to distinguish in many cases between acts of moral obliquity, eccentricity, or viciousness on the one hand, and actual insanity on the other; between responsibility and irresponsibility. By the multiplication of terms of uncertain meaning they have darkened counsel.

It is liable also, in my opinion, to the further serious objection that it influences, unconsciously but perceptibly, certain alienists to extend unreasonably the limits of the term insanity. I am at least certain that, in this regard, it works mischief in its influence upon the people at large, among whom the word kleptomania and other analogous terms introduced by writers upon mental diseases are in common use, and by whom in most cases they are employed as an apology for crime. I would prefer, therefore, when a man steals and his conduct in other matters shows that he is of unsound mind, that he should be called insane, and not a kleptomaniac; but if he steals, even where the motive may not be apparent, and in all other respects his conduct is consistent, and his mind appears sound, it would be better both for the interests of science and of society that he be called a thief.

On motion of Mr. Eller, it was resolved that the thanks of the Society be tendered to the Hon. William Barnes for the able and impartial manner in which he had presided over its deliberations during his term of office, that his excellent inaugural address be incorporated in the archives of the Society, and that the recommendations therein contained be adopted.

On motion of Dr. Hardy, the resolution was amended that a vote of thanks be given to all retiring officers, to be added to the original resolution.

The regular order of business was then taken up, being a debate on Hon. Amos G. Hull's paper, entitled "Evidence of Experts." The following gentlemen participated: Dr. Hardy, Dr. Newman, Mr. Delaney, Dr. Harwood, Dr. Spitzka, Mr. Benn, Col. Moulton, Dr. Hamilton, and Mr. Hull.[1]

DR. SPITZKA, being called on by the President, said: I feel that I ought to be grateful for an opportunity as public as this one to modify equally public declarations regarding monomania, which our President has so flatteringly referred to. As there is a natural connection between this subject and the one of expert testimony, which is more particularly before the Society, I may be permitted as a preliminary to advance some observations on the latter theme. Our system has its merits and demerits. From a strictly scientific point of view, I do not think it can be sufficiently condemned. I have always regarded the Continental method as in every sense superior, and have not hesitated on public occasions to characterize our own, as it now exists, as defective, if not as opening the door to corruption. Still all this is judging in the abstract; inferior as it is to the best possible system, it is superior to the proposed one, condemned by Judge Hull, which would involve yoking the ox and ass together, by planting the Continental method of calling experts on the Anglo-Saxon judicial system. If you alter the entire procedure, and educate not only the general public, but the legal—nay, even the medical profession—up to a proper conception of the idea of an expert, then there would be no choice; consistency would demand the adoption of the corresponding expert system.

But to make a change which would be tantamount to throwing the choice of experts into the hands of college and society cliques, and which would give "experts" identical with or fully as incompetent as those who are now so frequently the subject of

[1] Prof. Hamilton begged to be excused during the progress of the debate, and the Vice-President, Hon. A. G. Hull, presided to the end of the meeting.

criticism, official sanction, and to protect them against the risks which uncertain knowledge runs under a properly directed cross-examination, strikes me as so weak as scarcely to merit serious criticism.

I have been in numerous courts of law of various degrees of excellence in several States and under various, often curious and unique, circumstances. I have consequently had an opportunity of exercising as well as undergoing criticism and analysis, and observed the matter of expert cross-examination both from the defensive and aggressive sides, and after mature deliberation have arrived at the conclusion that in a properly conducted cross-examination lies the future development of expert testimony under our legal system. I regret very much that Mr. Russell is not here to-night, as he seemed to be prepared to maintain, with accustomed ability and vigor, that the Continental method could be successfully applied to that system. As it stands, a layman may be pardoned for expressing a conviction, encouraged by the remarks of our retiring President, that the two do not harmonize in spirit. That in practice, the plan would work badly, and cause more irremediable dissatisfaction than the present one in its worst phases, I stated at the last meeting.

It is true that the effects of a good cross-examination are often lost owing to the inability of the court, and more frequently of the jury, to appreciate them. But obtuseness on the part of a judge, and stupidity or ignorance, or lack of technical knowledge on the part of a jury, are matters for which neither science nor our system is responsible. I have seen my learned friend, the reader of the paper, compel a professional expert (nevertheless an author on the subject of medical jurisprudence) to make statements as absurd as would be the uniting of the sacral plexus and the olfactory bulb. However gross the ignorance made manifest in such statements to expert critics, it could have been appreciated by the court only if it had been elicited in English vernacular, when it would have appeared as a yoking of the ox and the ass to the same plow.

With regard to monomania, while I have advanced reasons for retaining the term, and insisted that the abuse of a term did not necessarily compel those who properly limited it to abandon it, and while there are many good writers on this side of the Atlantic who have adopted it from my book and employed it in the same limited sense, I have resolved to eliminate it in the second edition. The maneuvres of a certain clique, which has succeeded in casting the same obloquy on the term which ought to have been heaped

on those who improperly employed it, may be said to have killed it. I feel that to retain it in nomenclature will expose him who uses it in the court-room, however properly, to ridicule and contumely, and will serve unscrupulous defenders of sane criminals as a welcome pretext for a *bogus* plea of insanity. How genuine the form of insanity, properly called monomania, is, as a defence in criminal trials, may be seen from the fact that Dubourke, who stabbed a number of women on 14th street, killing one of them, was classified under this head. Regretting that medical politicians should again prove triumphant, I am glad of the occasion offered by our President's cogent statement to announce that in place of the comprehensible but abused term, monomaniac, I propose to adopt a term employed by the Germans, which, with the disadvantages of an ultra-technical sound, unites the advantage of not having been compelled to own a number of illegitimate offspring.

E. H. BENN: Mr. President, this subject of expert testimony has been so well and so thoroughly considered, that it really seems as if there was little or nothing more to be said upon the subject. It would be different if I could discover anything in the remarks that have been made, or in the papers that have been read, with which I could quarrel. But there is nothing of the kind. The paper last read by the incoming President, if it does not exhaust the subject, leaves nothing to be said in regard to that part or branch of which he has treated, and the able review of Judge Hull's paper by the retiring President, exactly expresses my view with such clearness, that nothing I could say would add to their force or effect. I remember when Judge Hull's paper was read at the last meeting, that I then concurred in his views in respect to almost everything he said, and was glad to find that he, whose ability and long experience so well qualified him to judge, and to give opinions and instruction upon such a subject, entertained views that seemed to me so sensible and sound.

On one question, however, if I understood him correctly, I must be allowed to differ with him, and that is in regard to the recommendation that official experts be appointed or employed to give evidence for a party whether he wants them or not. I would give my reasons in detail for objecting to the appointment of such experts, were it not for the fact that, in the paper just read by our retiring President, my views are exactly expressed, and my statement would be but a repetition of them, with the disadvantage of not being as well stated as they are there stated in his carefully prepared review.

I may be mistaken, however, in my recollection of precisely what Judge Hull did state as his own views, and if so, it is possible we may not differ after all.

There are, however, able lawyers who do recommend the passage of a law authorizing the appointment or employment of official experts to give their opinions as evidence in controversies affecting the liberty and property of citizens, whether the citizen wants them or not.

Such a law, in my opinion, should meet with our united opposition. No man should be allowed to testify for another without his consent, and when a man's rights depend upon testimony, he should be allowed to produce that testimony himself and to select it, and not be compelled to accept other and possibly hostile witnesses, who might for various reasons that will readily suggest themselves to any of us, be unfit, for want of examination, attention, or otherwise, to give opinions or properly enlighten the court or jury in the case. I can, however, imagine a case where experts might, with great propriety, be called or selected by the court, and paid by the county to testify for a defendant; and that is in a criminal case, in a prosecution by the people against a prisoner who is unable to procure such witnesses himself.

In tender consideration for a citizen charged with crime, but not yet convicted, the people should see to it that he is deprived of no right on such a trial because of his poverty, and that no one should be unjustly convicted of a crime, because of a failure to procure evidence actually existing, which would tend to establish the truth. I can think of no other cases in which experts could properly be appointed or selected by the court.

In regard to expert testimony generally, widely different views are expressed, many claiming that it is of great value, while others claim that but little reliance can be placed upon it, and that it is usually a marketable commodity, and always to be looked upon with suspicion. I think such remarks are too often made without reflection. It is true, expert testimony is often unreliable, like other testimony, because the expert is dishonest, and often because being mere opinion, it cannot in the nature of things be mathematically certain.

In my experience, I have learned to look with suspicion on the testimony of experts in patent cases. I have known them in such cases to testify, each for his employer, with the same zeal as a counsel argues the case for a client, and with the same, if not a greater, anxiety to establish his employer's case than is manifested by the attorney or counsel; the experts for the opposite parties

giving directly opposite opinions based upon the same state of facts, and always favorable to their employers. Of course, we all understand that such diametrically opposite views given under oath in such cases are simply evidence of the dishonesty of one expert or the other, or both, but does not prove that expert testimony is unreliable or of no value. It is the peculiar province of the court or jury to weigh all such testimony and give it its true value, having the witness before them. Expert testimony is not only valuable and reliable, but is indispensable in the administration of justice.

What is expert testimony?

It is the opinions of witnesses having peculiar or superior knowledge in regard to the subject matter of inquiry, based upon facts assumed, or sworn to by others. An expert need not necessarily be a professional man to be entitled to testify as an expert. It is sufficient that he has more than common knowledge in relation to the subject, no matter how he got it. It is true, if a man has a license to practise law or medicine, it creates a presumption that he has more than common knowledge on subjects relating to his profession. But after all such may not be the fact, and he cannot, nor can any one be allowed, if objection is made, to give opinions as an expert until he is shown to have such superior knowledge, sufficient to qualify him to give an opinion on the subject, and the party objecting is entitled to examine him, or have him examined preliminarily, to test his qualifications.

Expert testimony is a high order of evidence, and an expert has some peculiar rights.

A physician, surgeon, lawyer, artist, or scientist, like any other witness, can be subpœnaed and compelled for the ordinary fees of a witness to attend court and testify to any fact material to the case which he has seen, heard or known. That is a duty that any and every man owes to the public, but when because of his superior skill, learning or knowledge he is subpœnaed to give an opinion as an expert, based upon facts sworn to by others, or to be there in court stated to him, he is not obliged to attend without pay, or if he attends and is sworn he is not obliged to give his opinion unless paid for it as a professional opinion. In a recent case in one of the courts in another State, a physician, for refusing after he was sworn to give an opinion, was adjudged by the court in contempt. He, however, carried the case by appeal to the highest court, where the order adjudging him in contempt was reversed, the Appellate Court holding that he was not obliged to testify as an expert without being paid for it as a professional opinion.

It thus becomes a matter of contract, and it is difficult to see how a man can be compelled to testify as an expert at all unless he chooses to do so, or unless he is paid such sum as he sees fit to charge. But the question more particularly under consideration now is, the value and the quality of the evidence.

A witness may testify as an expert in regard to technical terms, abbreviations or phrases in mercantile or other business, the value of services or property, the genuineness of hand-writing, whether or not lager-beer is intoxicating, or what could or would be sufficient to cause a bridge to fall, as well as on the subject of insanity, or what the result of a certain injury will be, or what is the cause of certain physical manifestations, or other questions requiring great learning or a higher order of knowledge, and on some of these questions there would be little probability of a witness being mistaken. A jury or court might well be ignorant of certain mercantile terms, or abbreviations, or words used in policies of insurance, or nautical phrases, which any merchant, insurance man or sailor would know all about. Such testimony would be valuable and reliable. Equally valuable, although necessarily more uncertain would be the testimony of a physician or surgeon in regard to the cause of certain symptoms, or in regard to an invisible internal injury, or in giving an opinion as to the future consequences of a present personal injury; and the fact that there is an uncertainty in such cases is what makes the testimony of experts on such subjects more important, and almost indispensable.

It is in such cases that skill, learning, and real ability become necessary and are valued and appreciated. In cases of insanity, we all know how very often the highest order of talent, the most careful and thorough study of the mind, and the closest scrutiny are required to determine whether a person is or is not insane, and the importance of a correct opinion in such a case can hardly be over-estimated. Property, character, liberty, and even life itself often turns upon the opinion of a witness having such superior skill and knowledge.

In murder cases, where the effect of poisons, or of wounds, or the identification of the body after death becomes a subject of inquiry (and the identification of a body is always necessary before a man can be convicted of murder), expert testimony necessarily becomes of great value. A juror, or perhaps the court, having only common knowledge or no knowledge at all upon such subjects might, and would be very likely to come to incorrect conclusions in such cases, whereas physicians or surgeons knowing the nature, quality and effect of different poisons, and understanding

the construction of the body, the shape, position and location of the bones, arteries and vital parts, could give opinions which, if not always absolutely certain, would be, and are much more likely to be correct than the opinions of the jurors, or of unskilled witnesses.

It is said of a distinguished naturalist that, being presented with a single bone which had been found in the earth, he constructed a plaster skeleton of the entire animal, adding all the others, and afterward, when the remaining bones were found, it was found that he had every part and bone correct, notwithstanding they were the fossil remains of an animal of a species then extinct. He was not mistaken in his opinion, and was fortunate in having the correctness of his conclusion proved.

The superior knowledge which qualifies a person to testify as an expert is often obtained, in part, at least, from books or the writings of men eminent in their professions. Yet such books themselves are not evidence, and cannot be read to the jury as evidence, being merely the unsworn statements of the authors. Yet a witness in such a case may be interrogated as to the source and extent of his knowledge for the purpose of testing his qualifications or to impair the effect of his testimony; and in such a case, if he swears to familiarity with the writings of certain authors, the books, or extracts from such books, may be read by the opposite party to disprove what he has sworn, or to show the witness to be unreliable, if such facts can be shown from the books. In such cases, and for such purposes, medical and other books are often read to the jury. And in some cases the courts have held it to be proper, or at least, the privilege of counsel, to read from such books, or from any books, in his argument to the jury, making them or the parts read a part of his argument. But it is now pretty well settled that such books cannot be so read even as a part of the counsel's argument, and that for the court to allow it is an error.

But, Mr. President, I have already said much more than I intended to when I arose, and will simply add that I think that expert testimony should be viewed and weighed like any other testimony, to be relied on when it appears to be reliable and the witness appears to be competent and honest, and to be valued in cases where such testimony is needed the same as we would value any other material or necessary evidence.

On motion of Dr. Spitzka, a committee was appointed as per recommendation of the retiring President in his address, to prepare and present a bill to the Legislature at its present session, re-

lating to a law in respect to the mode of executing the death penalty. The following gentlemen were appointed :

Dr. N. E. Brill, *Chairman;* Dr. E. C. Spitzka, Dr. Wm. L. Hardy, Dr. J. S. Wight, Hon. Wm. Barnes, C. H. Kitchell, Esq., W. H. H. Russell, Esq.

On motion of Dr. Harwood, the Secretary was requested to ascertain and report on what terms a competent stenographer could be secured to report the proceedings of this Society.

There being no further business, the Society adjourned.

GEO. W. WELLS, M.D.,
Secretary.

VALEDICTORY.

THE present number closes the Third Volume of the AMERICAN JOURNAL OF NEUROLOGY AND PSYCHIATRY, and this announcement we regret to couple with the further one, that this quarterly is to be discontinued. The undertaking by a majority of the editorial staff of a systematic treatise, which will encroach on such time as they could otherwise have devoted to the continued conduction of a periodical publication, is the reason for this step. We might urge in addition, as the editors of the *British and Foreign Medico-Chirurgical Review* did on a similar occasion, that the "day for quarterlies seems to be past," were it not that this admission would conflict with the many evidences of success, and the friendly and growing encouragement we have received—particularly during the past year. It became evident during this period that the plan of the publication, if continued, must have been materially modified, the publication of monographs in archives, and of preliminary communications and abstracts in weekly or semi-monthly sheets—of which *Mendel's Centralblatt* is so successful an example—seems best calculated to meet the wants of the neurological student of to-day. However, it is futile to discuss intentions which were frustrated by the undertaking of another enterprise. We can only mitigate the regret experienced at parting with those who have kept us company as readers for so many years, with the hope that this parting may be but temporary, and that we shall have the same support and kindly encouragement for our prospective new work, which it is the pleasant duty of the editors of the AMERICAN JOURNAL OF NEUROLOGY AND PSYCHIATRY to acknowledge.

EDITORIAL ITEMS.

Completion of the W. and S. Tuke Prize Essay.—The suspension of this JOURNAL will interrupt the completion of the W. and S. Tuke Prize Essay for the time being. Inasmuch as Dr. E. C. Spitzka, its author, assumes the responsibility for its delay, he will undertake, with the consent of his co-editors, to complete the essay in question as a separate publication. Subscribers to Vol. I. of the JOURNAL who desire to obtain the conclusion of the essay will oblige the author by sending him their addresses, and will be supplied with the remainder of the supplement from the same press which has been employed by the editors of the AMERICAN JOURNAL OF NEUROLOGY AND PSCYHIATRY, as soon as the literary engagements mentioned in the foregoing will permit.

Restraint in the Auburn Asylum.—The following is so calm and rational a statement of a matter in which the AMERICAN JOURNAL OF PSYCHIATRY was the first in this country to take ground in the person of its editors, that we cannot refrain from quoting it. As the outcome of trial by an experienced alienist, educated under the influence of the Utica School, it is of special significance at this moment, when other occurrences point to the fact that that school has seen its day.

Dr. Carlos MacDonald says:

The condition of the patients generally has continued substan-

tially the same as in the preceding year. Aside from mental maladies, there has been but little serious illness among the inmates, and none of an epidemic or contagious nature. It is also a source of gratification that, with the exception of the suicide above referred to, no untoward injury or accident has occurred. No patient has been subjected to mechanical restraint of any form, while instances of seclusion, or the use of narcotic drugs, as substitutes for restraint, have been of rare occurrence, the daily average amount of seclusion for the year having been but *a trifle over one quarter of one per cent of the average daily population*, as against one-half of one per cent for the preceding year. In fact, there have been continuous periods of nearly two months during which not a single instance of seclusion has occurred. Tendencies to violence on the part of patients have greatly diminished, since the total and final abolition of mechanical restraint, two and a half years ago, while that which was known as the "refractory" ward under the system of chains, shackles, handcuffs, camisoles, muffs, wristlets, and "crib" beds, formerly in vogue here, and which subsequently, under the milder forms of these restraints, then deemed necessary, was called the "disturbed" ward, has gradually changed in character until now it may justly be classed as a "quiet" ward, although still occupied by our "worst" and most troublesome cases.

It would seem that the question of mechanical restraint in the treatment of the insane, regarding the propriety of which there has been so much discussion, and even bitter controversy, is rapidly settling itself, and that the disuse of restraint may reasonably be predicted, in the near future, in every well regulated hospital for the insane. In this Asylum, we no longer even think of using it. In fact, a majority of our present corps of attendants have but little or no idea of its mechanism, and would be at a loss to know how to apply it, were it placed in their hands for that purpose. In the light of such experience, candor compels the admission, that whereas I formerly thought mechanical restraint almost a *sine qua non* in the treatment of a certain class of cases, and so advocated, I now not only regard it as unnecessary, but I sincerely believe that such cases may be managed far better and easier without it.

It has been said in defense of restraint, that American superintendents are obliged to resort to it because of a greater degree of turbulence manifested by the insane of this country, as compared with that of Great Britain, where, owing to an alleged national difference in temperament, insanity assumes a quieter and less

violent type; that, given similar conditions, as regards their mental manifestations, any intelligent American superintendent would manage his patients without restraint. This seems possible, and, formerly, I accepted it as furnishing a rational and satisfactory explanation of the difference in practice between the two countries, in the matter of mechanical restraint, but the marked change in the demeanor of patients which I have witnessed here, as a result of the impartial trial of the non-restraint system, has led me to regard the explanation as fallacious. Under the old system, as formerly practised here, could be seen to an extreme degree, the manifestations of violence, noise and confusion, which have been characterized as the "American type of insanity," while under the present methods, the ordinary condition of all the wards is one of marked order and quietude, and it may now be said that the prevalent type of insanity here, is similar to that described as existing in the British Asylums. Our "disturbed" ward has faded out, so to speak, and its departure has been followed by a gradual extension of the means and methods of occupation, embracing agricultural labor, the manufacture and repair of all shoes and slippers used by the patients, of all clothing excepting stockings, our tailor shop being manned entirely by patients; also the manufacture of tinware, as well as glazing, carpentry, painting, etc. With these facts before us, is not the inference a fair one that the "quiet type of lunacy" found in British Asylums is a *result*, rather than *a cause* of non-restraint? Observations made during my visit abroad last year, forced upon me the conviction that in this respect, at least, our English brethren are in advance of some of us on this side of the water. But already there are numerous indications of the commencement of a new era, in the care and treatment of the insane in this country, and it may safely be predicted that the not distant future will witness a marked modification in the form of construction, organization, and methods of conducting our hospitals for the insane. Even now, the most ardent advocates of the old system, still more or less prevalent, are, unconsciously perhaps, gradually diminishing the amount of restraint used, and otherwise modifying their practice, in accordance with the spirit of progress which now obtains.

I am well aware that the ground here taken, regarding the question of restraint, is opposed to that occupied by a considerable number of my professional brethren, some of whom are veterans in the field of lunacy, and whose opinions are entitled to great respect, yet it seems to me that, given suitable attendants whose sympathies and training are in that direction, any Superintendent

who will make a fair, thorough and impartial trial of non-restraint in the management of his patients, cannot fail to be favorably convinced, even though it be "against his will."

Hypertonia Musculorum Pseudohypertrophica.—Under this title A. Eulenburg reports a curious case, somewhat resembling Thomsen's disease, but presenting certain anomalies. The chief symptoms were rigidity of the muscles, difficulty in voluntary motion, and increased volume in the muscles affected. The patient, a male, twenty-seven years old, had no hereditary predisposition to nervous disease, and was well until his twentieth year. At that time there generally developed a difficulty in standing and walking, retention of urine, and vesical tenesmus, as well as occasional incontinence, and a certain stiffness in the use of the arms. At the same time an indifferent and melancholy disposition, without apparent cause, came over the patient, producing a decided change in his character. This condition has persisted, and when he was examined by Eulenburg he presented the following symptoms: The gait of the patient is peculiar, he shuffles along, never raising his heel from the ground, never fully extending his legs, but keeping his knees bent. He cannot step up upon a stool, and sitting down or rising is a difficult matter, especially the latter, which is only possible by the aid of his hands. The reason for this is a marked rigidity of the quadriceps femoris and muscles of the calves of the legs. These muscles stand out like those of an athlete, although the body of the patient is thin. The rigidity which is accompanied by a hardness of the muscles is not due, however, to their active contraction. When the patient stands for some time in one position, the rigidity gradually passes off, but returns as soon as any active or passive movement is made. The muscles on the outer side of the hip presented a similar condition, but the adductors, flexors, and glutei escaped. When the

patient was seated, motions could only be made with great effort and slowly in the affected muscles. It was then evident that the extensors of the foot and tibialis anticus were also involved. The mechanical contractility was not increased, but rather diminished. The patellar tendon reflex was absent on both sides. The skin reflexes were normal. Plantar reflex present. Foot-clonus absent. Paradoxical contraction (contraction of the Tib. Ant. with prominence of its tendon after passive dorsal flexion of the foot) was present. The deltoid, triceps, and extensors of the forearm were the muscles affected in the arms, and the same slow action, prominence, and rigidity with hardness was noticed. The other muscles presented no changes. Speech was slow but undisturbed; patient could not whistle. The tongue was thick and tremor was present. No affection of the eyes. Pupil reflexes normal. No disturbances of sensation. Marked diminution in the reaction of the affected muscles, to both faradic and galvanic electricity through both nerve and muscle, without any evidence of reaction of degeneration.

Eulenburg considers that the symptoms indicate a severe central disease of the cord of unknown origin and location, and reports the case as one of a hitherto unnoticed affection. (*Neurol. Centralbl.*, No. 17, 1884.) M. A. S.

Infantile Hemiplegia.—E. Gandard has collected eighty cases of hemiplegia occurring in infants, and has observed fourteen cases in the clinique of Prof. d'Espine, of Geneva. None of these cases were of a temporary character, and all cases due to tumor were excluded from consideration. The observer reaches the following conclusions:

1. Infantile cerebral paralysis is a more frequent occurrence than infantile spinal paralysis. It occurs, like

the latter, more commonly during the first three years of life. It may begin with or without a loss of consciousness, after an attack of unilateral convulsions, or rarely it may come on gradually.

2. It is distinguished from hemiplegia in adults by its influence upon the growth of the bones; the arm, less frequently the leg, and rarely the entire half of the body and head, being retarded in their development.

3. The usual cause of the hemiplegia is meningo-encephalitis in the motor area of the cortex; occasionally it may be a softening from embolism, and more rarely a hemorrhage.

4. The hemiplegia occurs sometimes in children who are recovering from an acute disease.

5. The mental faculties usually are unimpaired (twelve cases in fourteen).

6. Treatment by electricity and orthopædic apparatus has a decidedly beneficial influence, in counteracting the deficient development, the secondary contractures, and the deformities. (*Neurol. Centralbl.*, No. 18, 1884.) M. A. S.

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